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CONSUMER-BASED TRANSIT PRICING AT THE CHICAGO TRANSIT AUTHORITY

Volume II

MARKET ANALYSIS OF CHOICE OF METHOD OF PAYMENT FOR CTA RIDERS

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16. Abstract

This report discusses the development and implementation -- as well as the resulting revenue and ridership impacts -- of a new fare structure for the Chicago Transit Authority. The CTA sought a new structure that would offer riders a range of fare options, including the ability to pay less than they did under the previous structure. Through the use of "deep discounting," in combination with differential pricing (based on service quality or time of day), it was felt that the CTA could achieve the typically elusive goal of increasing both ridership and revenue.

Volume II examines the method of payment behavior of CTA riders based on survey data including information on current method of payment, future choice of method of payment under a variety of fare structures, ratings of pass and token payment attributes, demographic characteristics and riding patterns. The primary objective of this study is to develop a model which can be used to predict future choice of method of payment under a wide range of fare structures. The study identified monthly cost as the most important factor in choice of method of payment. Monthly cost includes the effect of differences in riding patterns by including CTA usage frequency and percent of trips made with tranfers in the computation of monthly cost for each respondent. Demographic characteristics were not found to have any substantial impact on choice of method of payment. The models selected consider cost differently for different methods of payment to account for the higher rate of substitution between cash and tokens than between either of these ride-based methods and passes. The selected models, which include monthly cost and monthly cost differences, were used to develop predictions of the future share of method of payment for selected fare structure scenarios.

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MARKET ANALYSIS OF CHOICE OF METHOD OF PAYMENT FOR CTA RIDERS

TASK 2 REPORT

CONSUMER BASED FARE STRUCTURES STUDY AND PROGRAM DESIGN

PREPARED FOR

CHICAGO TRANSIT AUTHORITY

BY

MIDWEST SYSTEM SCIENCES, INC

JUNE 1991

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MARKET ANALYSIS OF CHOICE OF METHOD OF PAYMENT
FOR CTA RIDERS
prepared for
CHICAGO TRANSIT AUTHORITY
by
MIDWEST SYSTEM SCIENCES, INC
JUNE 1991

EXECUTIVE SUMMARY

This report examines the method of payment behavior of CTA riders based on survey data including information on current method of payment, future choice of method of payment under a variety of fare structures, ratings of pass and token payment attributes, demographic characteristics and riding patterns. The primary objective of this study is to develop a model which can be used to predict future choice of method of payment under a wide range of fare structures.

The demographic and CTA riding patterns of the sample are described and the demographic distributions are compared to data collected in an earlier market study. This comparison indicates that this sample is representative of current CTA riders.

Current method of payment is described for the entire sample and separately for full and reduced fare riders. Approximately three-quarters of respondents use a single method of payment all the time. Of these, the majority (59%) use cash exclusively, followed by exclusive use of pass (15%) and exclusive use of token (4%). Other riders mix their use of methods of payment with most using a combination of cash with passes or tokens.

The ratings of passes and tokens with respect to attributes describing the benefits of pass/token use and impediments to their use are generally favorable. However, there are substantial differences in ratings between users and non-users of each method of payment.

Responses to forced choices of future method of payment under different fare structures show that respondents react logically to changes in fare structure. These responses are found to be reasonably consistent with current method of payment choice. Some differences are noted which indicate the need to adjust models based on stated future choice to account for differences in stated future intentions and expected future choice. The sample is divided into seven segments based on full or reduced fare payment and the type of pass (or no pass) chosen by respondent for future choice questions. Pass - cash - token models are estimated for all groups considering future choice of both pass and tokens and token - cash models are estimated for groups considering future choice of token and cash only.

This study identified monthly cost as the most important factor in choice of method of payment. Monthly cost includes the effect of differences in riding patterns by including CTA usage frequency and percent of trips made with transfers in the computation of monthly cost for each respondent. Demographic characteristics were not found to have any substantial impact on choice of method of payment. The models selected consider cost differently for different methods of payment to account of the higher rate of substitution between cash and tokens than between either of these ride-based methods of payment and passes.

Method of payment attribute ratings also influence method of payment choice.
The most important attributes for comparison among pass, cash and tokens are: "save time" and "advance cost not too high". For comparison between tokens and cash "convenience" and "vendor access" were most important. These findings indicate attributes which should be improved to increase pass and token use.

The selected models, which include monthly cost and monthly cost difference, are used in Task 3 to develop predictions of the future share of method of payment for selected fare structure scenarios. An example is included in this report to illustrate the potential for increased adoption of non-cash methods of payment. This example indicates substantial potential for increased use of passes through the adoption of a wider range of pass types which enable lower pass prices to be offered for passes with restricted time periods of use. It also indicates a substantial potential for increased use of passes and tokens through increases in the price differential between cash and alternative methods of payment.

MARKET ANALYSIS OF CHOICE OF PAYMENT METHOD FOR CTA RIDERS
Task 2 Report

1. INTRODUCTION

The "Consumer Based Fare Structures Study and Program Design" project is designed to provide the CTA with support and guidance in formulating alternative fare structures, selecting a specific structure for implementation in 1990, and evaluating the impacts of the selected structure. The study is organized in two phases. The first phase includes the development of fare structure recommendations, design of an implementation and marketing plan and development of an evaluation plan.

One component of the development of the fare structure recommendations is the formulation of a model to predict the ridership and revenue impacts of alternative fare structures. This model is based on predictions of future choice of method of payment and ridership changes in response to fare changes. The analysis of ridership changes is based on prior analyses of market elasticities performed by and for the CTA (Fares Structure Analysis, Final Report and Summary, submitted to Chicago Transit Authority by LTI Consultants, Inc. and Erwin A. France & Associates, March 1988). However, there is no prior basis to predict the shares of CTA users choice of alternative methods of payment. Task 2 of the study is designed to analyze the current and expected future choice of method of payment and to develop a model of future method of payment choice. This report presents the results of this effort.

2. STUDY APPROACH

The analysis of future method of payment choice is based on a survey research approach and the development of disaggregate models of method of payment choice. This approach included four sub-tasks: questionnaire design, sample design, descriptive analysis of data and the development of the method of payment choice model.

The questionnaire designed for this study was based on a structure previously developed by Midwest System Sciences, Inc. for transit mode choice analysis and applied in a variety of urban transit contexts. The questionnaire, a copy of which is attached as Appendix 1, includes six blocks of questions as follows:

> Screening questions to identify a CTA rider based on the criterion of having ridden CTA during the last week.
>
> Description of ridership during the last week including details of weekday/weekend split, peak period usage for weekdays and the share of travel by single bus, multiple buses, bus and rail and rail only.

Information on method of payment used during the last three months including cash, tokens, passes and combinations of each.

Ratings of the use of tokens and passes on five attributes including "saving time", "saving money", "(not) difficult to buy", "(not) too much advance payment necessary" and "convenience". In addition, for passes only, respondents were asked to rate the desirability of credit card purchase.

Questions about the likelihood of future purchase of tokens and passes relative to cash for different prices of tokens, passes and cash fare. Different questions were asked for full and reduced fare patrons. Further, respondents were asked to select among three types of passes (two for reduced fare riders): Every Day, Weekday Only and Peak Only passes.

Socio-demographic information.

The study was directed to CTA riders in the CTA service area. The initial sample was based on a list of CTA user telephone numbers obtained from a prior CTA service area marketing study, supplemented by telephone numbers of token users gathered at selected boarding points by the CTA. Additional calls were made to meet the sample size required by incrementing numbers on the original service area phone list and screening for CTA usage to obtain a further random sample of CTA riders.

The next sections of this report include the descriptive analysis of the sample data, description of methods of payment used and rating of method of payment, and the development of the method of payment choice model.

3. SAMPLE DESCRIPTION

The original survey data, collected by Martinez Associates Ltd. in August 1989, included 832 cases. Screening for CTA ridership and inclusion of current method of payment information reduced the sample to 799 cases.

The characteristics of the sample are presented in Appendix 2, Distribution of Socio-Demographic Characteristics. Table 1 includes selected information from that appendix.

Table 1
Selected Socio-Demographic Information

VARIABLE	AVERAGE VALUE	SHARE OF SAMPLE
HOUSEHOLD SIZE (>12 YEARS)	2.67	
NUMBER OF CTA USERS/HH	1.96	
DRIVER'S LICENSE		59.1%
NUMBER OF DRIVERS IN HOUSEHOLD	1.60	
NUMBER OF CARS OWNED	1.18	
RACE DISTRIBUTION		
WHITE SHARE		42.2%
BLACK SHARE		44.6%
OTHER SHARE		13.2%
SEX DISTRIBUTION (MALE SHARE)		33.5%
EMPLOYMENT (SHARE EMPLOYED)		68.5%
INCOME DISTRIBUTION		
LESS THAN $20,000		38.8%
$20,000 TO $40,000		39.9%
MORE THAN $40,000		21.3%
REDUCED FARE RIDERS		24.9%

These data were compared to service area data collected as part of the marketing research study conducted for the CTA in 1988/89 by Market Opinion Research and Midwest System Sciences, Inc. (Household Survey of the CTA Service Area, Table 5.1 and Appendix C). The sample distribution for CTA riders in the current study was found to be similar to that in the earlier survey. Specific comparisons for distribution by race, gender and income are shown in Table 2.

Table 2
Comparison of CTA Rider Characteristics

VARIABLE	CTA SERVICE AREA STUDY	FARE STUDY
RACE DISTRIBUTION		
WHITE SHARE	48%	42%
BLACK SHARE	38%	45%
OTHER SHARE	14%	13%
SEX DISTRIBUTION		
FEMALE SHARE	63%	67%
MALE SHARE	37%	33%
INCOME DISTRIBUTION		
LESS THAN $20,000	39%	39%
$20,000 TO $40,000	40%	40%
MORE THAN $40,000	22%	21%

The three distributions are similar between the two surveys. The largest differences are for race and gender, but none of these differences are large enough to require any sample adjustment.

The riding habits of respondents in this sample are presented in Appendix 3 (Ridership and Method of Payment Characteristics). Some of the more interesting characteristics are presented in Table 3.

Table 3
Sample Ridership Characteristics

VARIABLE	SHARE OF SAMPLE
DAYS RIDE CTA PER WEEK	
1 - 2 DAYS	22.4%
3 - 4 DAYS	18.7%
5 DAYS	33.1%
6 - 7 DAYS	25.8%
WEEKEND DAYS RIDE CTA	
NONE	58.7%
ONE	24.7%
TWO	16.6%
CTA TRIPS ON WEEKDAY ON WHICH CTA WAS USED	
ONE TRIP	10.5%
TWO TRIPS	66.1%
3 - 4 TRIPS	17.2%
FIVE OR MORE TRIPS	6.3%
CTA MODE USED	
SINGLE BUS ONLY	31.1%
MULTIPLE BUSES	35.4%
RAIL AND ONE OR MORE BUSES	21.9%
RAIL ONLY	11.5%
PEAK PERIOD SHARE OF WEEKDAY CTA TRIPS	72.7%

Some additional observations about the ridership characteristics are:

59% of the sample ride only on weekdays.

Less than 1% of the sample ride only on weekends.

The average number of trips per week is 10.5 and the most common number of trips per week is 10; an average of 9.4 of the weekly trips are made on weekdays.

57% of all CTA trips include one or more transfers.

The most important major differences in ridership characteristics by demographic group are that Blacks use CTA more than others (as measured by the number of days per week using CTA and the number of CTA trips per week - both for weekday and weekend travel).

The most common CTA travel pattern in these data is to make two trips per day for five days per week, with most of those trips during the peak period. However, many CTA riders have different patterns of ridership. A large of CTA riders ride CTA fewer or more than five days per week. An important share make more than two trips on a typical weekday. An important share of trips are made outside the peak period.

These observations suggest that while there is a primary market (riders who make peak period work trips on a daily or near daily basis) for CTA services which should receive careful attention in any CTA planning, there are numerous other markets which together make up a large share of CTA ridership.

4. METHOD OF PAYMENT USED AND RATINGS

The current method of payment provides a market basis for estimating future method of payment. CTA riders vary widely in their choice of method of payment, including riders who use only cash, pass or tokens and riders who mix methods of payment. The fractions which used each method of payment or combination of methods of payment in the preceding three months are shown in Table 4 (the distributions of method of payment shares are included in Appendix 3).

Table 4
Method of Payment Shares by CTA Rider

	FULL FARE RIDERS	REDUCED FARE RIDERS	ALL RIDERS
Single Method of Payment			
Cash Only	56.7%	65.8%	58.9%
Pass Only	16.0%	10.6%	14.6%
Tokens Only	4.8%	2.5%	4.3%
Multiple Method of Payment			
Cash and Pass	8.8%	8.5%	8.8%
Cash and Tokens	8.2%	9.1%	8.4%
Pass and Tokens	1.3%	0.5%	1.1%
Cash, pass and tokens	4.2%	3.0%	3.9%
Total - All methods	100.0%	100.0%	100.0%

The largest share of method of payment for both full and reduced fare passenger is cash only. However, there is a substantial difference between these two groups of riders. A much larger share of full fare passengers use either passes or tokens or both. This difference may be due to lower absolute discounts of passes and tokens for reduced fare riders. The discounts for passes (for a range of monthly ridership patterns) and tokens on a per trip basis are given in Table 5 for full and reduced fare riders.

Table 5
Discounts per Ride for Passes and Tokens

	Full Fare	Reduced Fare
Pass Discount (assuming one half of all trips require a transfer) for:		
Trips/week		
50	12.5	7.5
60	29.2	15.8
70	41.1	21.8
Pass Discount (assuming all trips require a transfer) for:		
Trips/week		
50	25.0	15.0
60	41.7	23.3
70	53.5	29.3
Token Discount	5.0	0.0

Currency exchanges are the primary outlet for purchasing both passes (66%) and tokens (46%).

A large share of token usage is made under circumstances where little or no time or convenience savings can be obtained (28% of token users buy a transfer all the time and an additional 13% buy a transfer most of the time).

Respondents were asked to rate five attributes of token/pass payment. The average ratings obtained for tokens and passes are shown in Table 6.

Table 6
Token and Pass Ratings*

ATTRIBUTE	TOKEN RATINGS	PASS RATINGS
TOKENS/PASSES SAVE TIME	3.67	4.00
TOKENS/PASSES ARE MUCH CHEAPER THAN CASH	3.37	3.57
TOKEN/PASS VENDORS ARE NOT HARD TO FIND	3.50	3.68
TOKENS/PASSES DO NOT COST TOO MUCH IN ADVANCE	3.33	3.15
TOKENS/PASSES MORE CONVENIENT THAN CASH	3.66	3.91

* Rating scale: 1=Strongly Disagree, 5=Strongly Agree

Passes are rated higher than tokens on "save time", "cheaper than cash", "not hard to find" and "more convenient than cash" but lower on "not cost too much in advance". However, none of these differences is large. These ratings indicate that the presumed advantages of token/pass payment ("save time", "much cheaper than cash" and "convenient") are recognized by CTA riders and that the potential problems ("vendors are hard to find" and "cost too much in advance") may be less serious obstacles than previously expected. However, the lack of market penetration indicates that changes in the characteristics of passes/tokens will be necessary to increase use of these methods of payment.

It is instructive to examine the ratings of tokens/passes separately for people who do or do not use tokens/passes. These differences for tokens and passes are shown in Tables 7 and 8, respectively.

Table 7
Token Ratings by Token Usage

ATTRIBUTE	TOKEN USERS	NON-TOKEN USERS
TOKENS SAVE TIME	4.47	3.63
TOKENS ARE CHEAPER THAN CASH	4.07	3.34
TOKEN VENDORS ARE NOT HARD TO FIND	4.18	3.47
TOKENS DO NOT COST TOO MUCH IN ADVANCE	3.97	3.30
TOKENS MORE CONVENIENT THAN CASH	4.41	3.62

Table 8
Pass Ratings by Pass Usage

ATTRIBUTE	PASS USERS	NON-PASS USERS
PASSES SAVE TIME	4.52	3.92
PASSES ARE CHEAPER THAN CASH	4.09	3.48
PASS VENDORS ARE NOT HARD TO FIND	4.02	3.62
PASSES DO NOT COST TOO MUCH IN ADVANCE	3.69	3.05
PASSES MORE CONVENIENT THAN CASH	4.35	3.83

Users of tokens and passes rate the attributes of these methods of payments higher than non-users. This pattern is expected for two reasons. First, people who rate a service more highly are more likely to use it. Second, users are more likely to rate a service highly in order to justify their decision to use it. The magnitude of the differences range from 0.52 to 0.84. These values are statistically significant and large enough to be managerially important.

If non-users' perceptions of these methods of payment were to improve, it is likely that a substantial shift in method of payment would take place. Actual changes in the characteristics of these methods of payment, rather than marketing activities alone, will be necessary to cause a large share of non-users to increase their evaluations of these methods of payment substantially. Such changes might include discounting the cost of passes and tokens relative to cash, increasing the availability of passes and tokens and improving the usage characteristics of passes and tokens so that users would save time relative to using cash.

There are interesting differences in method of payment shares between gender and racial groups. Males use cash and pass more than females and females use tokens more than males. Whites use cash and tokens more than Blacks and Blacks use passes much more than Whites (20.5% vs. 10.8%).

These differences are related, in part, to differences in ratings of method of payment attributes for gender and racial groups. Females rate vendor access, for both tokens and passes, higher than Males. Blacks rate vendor access, for both tokens and passes, and time and cost savings of passes higher than Whites.

5. FUTURE METHOD OF PAYMENT CHOICE MODEL

A two stage procedure is used to estimate a method of payment choice model for predicting the shares of riders expected to choose passes, tokens and/or cash. The first stage estimation is based on stated intentions responses to a series of questions about future method of payment under a range of fares. The second stage adjusts these initial estimates to take account of reported current method of payment shares.

The questions about future method of payment were designed to cover a wide range of prices of tokens and passes relative to cash fares. In each case, the respondent was asked to indicate the likelihood of using tokens/passes rather than cash for three levels of token/pass cost with the current cash fare, and one level of token/pass cost with an increased cash fare. In addition, respondents were asked to make one direct choice comparison between tokens and passes. The costs used for the tokens/passes differ among respondents depending on whether they are full fare or reduced fare riders and on the type of pass they choose to rate (see sections 5.1 and 5.2).

These choice responses are combined in a data base which includes pairwise choices of tokens versus cash, passes versus cash and passes versus tokens. This data file is used to estimate binary choice models of tokens versus cash for respondents who did not rate passes at all and multinomial models of token, pass and cash payment for all other respondents. The estimation results obtained are adjusted to match the current level of token and pass usage (based on current method of payment) when token and pass prices are equal to current prices.

5.1 Description of Future Choice of Payment Responses

The analysis of the future choice of token versus cash is based on responses to a series of questions describing the cash fare and the price for ten tokens (full fare riders) or twenty tokens (reduced fare riders). The specific cash fare and token prices and the average response are given in Table 8 for full fare riders and Table 10 for reduced fare riders using the following response scale (reversed from the scale in the questionnaire 10 so that a higher score indicates an increased likelihood of buying tokens.

5 Definitely buy tokens.
4 Probably buy tokens.
3 Maybe buy tokens.
2 Probably not buy tokens.
1 Definitely not buy tokens.

Table 9
Future Token Purchase for Full Fare Riders

Cash Fare	Cost per Ten Tokens	Average Score
$1.00	$7.50	3.74
$1.00	$8.50	3.23
$1.00	$9.50	2.39
$1.25	$9.50	3.56

Table 10
Future Token Purchase for Reduced Fare Riders

Cash Fare	Cost per Twenty Tokens	Average Score
$0.50	$8.00	3.21
$0.50	$9.00	2.64
$0.50	$10.00	2.13
$0.75	$10.00	3.35

These tables indicate a logical pattern of responses. Both full and reduced fare riders have an increased likelihood of using tokens when the cost of tokens is reduced or the cash fare is increased. The range of average responses indicates a high degree of sensitivity to changes in the price differences between tokens and cash.

Reduced fare riders are consistently less likely to purchase tokens than full fare riders. We believe this is a result of the smaller dollar discount on tokens for reduced fare riders due, in part, to the fact that reduced fares are already quite low. The data do not support the conjecture of some that reduced fare riders make fewer trips than full fare riders.

The corresponding analysis of future choice of pass versus cash is based on responses to a series of questions describing the cash fare and the price of three different monthly passes for full fare riders and two different monthly passes for reduced fare riders. The different pass types are an Every Day pass, a Week Day Only pass and, for full fare riders only, a Peak Only pass. Respondents were asked to select one of the available pass types based on their own travel requirements. The specific objective was to test the feasibility of attracting travelers who make a smaller number of trips in specific time periods to adopt passes which are more limited, and less costly, than the current Every Day pass.

The number and share of full and reduced fare riders who responded to questions about use of each type of pass or refused to consider any type of pass are reported in Table 11.

Table 11
Number and Share of Respondents in Each Method of Payment Market Segment

Pass Type	Full Fare Riders		Reduced Fare Riders	
	Number	Share	Number	Share
Every Day	237	39.5%	84	42.2%
Weekday	115	19.2%	37	18.6%
Peak Only	125	20.8%	--	-----
No Pass	123	20.5%	78	39.2%
Total	600	100.0%	199	100.0%

Among full fare riders, there is a strong relationship, as expected, between the type of pass selected and the number of trips per week for weekday and weekend trips. That is, respondents who travel more are more likely to consider the Every Day pass than others. Among reduced fare riders there is no significant relationship between current ridership and selection of the every day or weekday pass.

The response scale used for future pass use questions was the same as for future token use questions and the scales were also reversed so that a higher score indicates an increased likelihood of buying passes.

The average responses for full fare passengers for three pass types are reported in Table 12 and for reduced fare passengers for two pass types in Table 13.

Table 12
Future Pass Purchase for Full Fare Riders

Cash Fare	Every Day Price	Every Day Score	Week Day Only Price	Week Day Only Score	Peak Only Price	Peak Only Score
$1.00	$40.00	4.43	$35.00	4.19	$30.00	3.98
$1.00	$50.00	3.44	$45.00	2.74	$35.00	3.16
$1.00	$60.00	2.19	$50.00	1.89	$40.00	2.24
$1.25	$60.00	2.96	$50.00	3.20	$40.00	3.47

Table 13
Future Pass Purchase for Reduced Fare Riders

Cash Fare	Every Day Price	Every Day Score	Week Day Only Price	Week Day Only Score
$0.50	$20.00	4.26	$15.00	3.76
$0.50	$25.00	3.82	$20.00	2.97
$0.50	$30.00	2.55	$25.00	2.39
$0.75	$30.00	3.04	$25.00	3.27

These tables, like those for the token versus cash responses, indicate a logical progression of responses. Both full and reduced fare riders have an increased likelihood of buying passes as the pass price decreases or as the cash fare is increased. These responses also indicate a high level of interest in pass purchase when the pass price is reduced relative to current levels.

The last future choice question requested respondents to make a choice between token and pass purchase. The average responses to these questions for different groups of riders are given in Table 14, where the scales are structured so that a higher average rating indicates an increased likelihood of buying the pass rather than tokens.

Table 14
Future Choice of Pass Purchase versus Tokens

RIDER GROUP	PASS TYPE	TOKEN COST ($/RIDE)	PASS COST ($/MONTH)	AVERAGE SCORE
FULL	EVERY DAY	0.85	$50.00	3.65
FULL	WEEKDAY	0.85	$45.00	3.25
FULL	PEAK ONLY	0.85	$35.00	3.62
REDUCED	EVERY DAY	0.50	$25.00	3.93
REDUCED	WEEKDAY	0.50	$20.00	3.73

This table indicates that among all the groups which considered passes, respondents are more likely to buy passes than to buy tokens for the prices used in this question. The lowest indication of pass is for Weekday Only passes for full fare passengers. This suggests that if this pass is to be effective, it will have to have a greater discount relative to the Every Day pass than that used in the survey.

5.2 Comparison of Stated Future Choices and Current Choices

It is important to test the extent to which responses to stated intentions questions represent the actual choice behavior which would occur should the stated future conditions arise. We do this by comparing the future stated method of payment responses for the questions based on current fares to the current reported method of payment. Comparisons were made for four groups of survey respondents (identified by full or reduced fare and responding to questions about every day passes or not). The comparisons for the two groups of full fare passengers, three-fourths of the sample, are reported here. The comparisons for reduced fare passengers obtained similar results. We compare current and future method of payment share for tokens, passes and cash for full fare passengers who rated the Every Day pass. We compare the current and future method of payment shares for tokens and cash only for full fare passengers who did not rate the every day pass.

The first step in this process is to produce an estimate of future method of payment share for each respondent from their responses to future choice questions using current costs for tokens, passes and cash fares. This process requires transformation of the stated likelihood of using each method of payment into choice probabilities. The transformation, based on judgement, is as follows:

RESPONSE	PROBABILITY
Definitely buy tokens.	0.90
Probably buy tokens.	0.70
Maybe buy tokens.	0.50
Probably not buy tokens.	0.30
Definitely not buy tokens.	0.10

Next, we combine the binary choice probabilities (indicated by subscript 2) for tokens versus cash and pass versus cash using the following formulae to obtain multinomial choice shares (indicated by subscript 3) for tokens, cash and passes.

$$[\mathit{Cash\ Share}]_3 = \frac{1}{1+\frac{[\mathit{Token\ Share}]_2}{1-[\mathit{Token\ Share}]_2}+\frac{[\mathit{Pass\ Share}]_2}{1-[\mathit{Pass\ Share}]_2}}$$

$$[\mathit{Pass\ Share}]_3 = [\mathit{Cash\ Share}]_3 \times \frac{[\mathit{Pass\ Share}]_2}{1-[\mathit{Pass\ Share}]_2}$$

$$[\mathit{Token\ Share}]_3 = [\mathit{Cash\ Share}]_3 \times \frac{[\mathit{Token\ Share}]_2}{1-[\mathit{Token\ Share}]_2}$$

This gives us stated future method of payment shares which can be compared to the current method of payment shares shown in Appendix 3.

Finally, we compare the current and future method of payment shares. First, we consider the shares for full fare passengers who responded to the Every Day pass questions. Table 15 shows the comparison of reported current and stated future method of payment shares for token, pass and cash for full fare riders who provide future payment information for tokens versus cash and Every Day passes versus cash and tokens. A good relationship between stated future and reported current method of payment would be indicated by a relatively large number of persons who had low (or high) usage of each method of payment also stating they would have low (or high) usage of that method of payment for the same price structure in the future.

Table 15
Comparison of Current Reported and Future Stated Method of Payment Shares - Full Fare Riders Who Evaluate Every Day Passes

Part A - Pass Shares

Current Shares (% of Pass Use)	0 to 25%	25+ to 75%	75+ to 100%	Total
Future Shares Based on Current Fares				
0 to 25%	62	0	6	68
25+ to 50%	36	5	7	48
50+ to 75%	26	5	18	49
75+ to 100%	12	5	40	57
Total	136	15	71	222

Part B - Token Shares

Current Shares (% of Token Use)	0 to 25%	25+ to 75%	75+ to 100%	Total
Future Shares Based on Current Fares				
0 to 25%	157	2	1	160
25+ to 50%	34	3	2	39
50+ to 75%	11	0	0	11
75+ to 100%	6	2	4	12
Total	208	7	7	222

Part C - Cash Shares

Current Shares (% of Cash Use)	0 to 25%	25+ to 75%	75+ to 100%	Total
Future Shares Based on Current Fares				
0 to 25%	53	18	39	110
25+ to 50%	21	4	45	70
50+ to 75%	3	0	22	25
75+ to 100%	1	0	16	17
Total	78	22	122	222

Part A of the table for pass payment shows a reasonable degree of consistency between reported current and future stated shares. Almost half of the people who use pass 0 to 25% of the time indicated that they would use pass only 0 to 25% of the time when the fares equal current fares. More than half of the people who use pass more than 75% of the time indicated that they would use pass more than 75% of the time. Part B shows that most riders use tokens less than or equal to 25% of the time. Of these, the overwhelming majority, 157 of 208, indicated they would use tokens less than or equal to 25% of the time with the same fares.

The results for cash payment comparison (Part C) are somewhat less consistent than the pass and token tables. For those who currently use cash 25% of the time or less, most (53 of 78) indicate that they would use cash 25% of the time or less. However, of those who use cash most of the time, less than one-sixth indicate they would use cash most of the time with the same fare structure. This result may be due in part to the stated context of the future questions which indicates a high degree of token/pass availability. This suggests an underlying interest by a large share of cash users in increased use of alternative non-cash methods of payment.

The corresponding analysis for individuals who do not evaluate the Every Day pass is made in terms of cash use only, as token use is simply the residual of cash use in this case. Table 16 shows the comparison of reported current and stated future method of payment shares for cash for full fare riders who provide future payment information for tokens versus cash only.

Table 16
Comparison of Current Reported and Future Stated Method of Payment Shares - Full Fare Riders Who Do Not Rate Every Day Passes

Current Shares (% of Cash Use)				
	0 to 25%	25+ to 75%	75+ to 100%	Total
Future Shares Based On Current Fares				
0 to 25%	34	10	17	62
25+ to 50%	8	5	46	59
50+ to 75%	4	1	64	69
75+ to 100%	2	4	101	107
Total	49	20	228	297

This table shows a high degree of consistency between reported current shares and stated future shares between tokens and cash payment: most riders who use cash 25% of the time or less state that they would use cash 25% of the time or less and most riders who use cash more than 75% of the time state they would use cash more than 75% of the time. These results support the earlier conclusion that stated future method of payment is a reasonable representation of the actual choice of method of payment which would occur if the fare structure is changed.

These comparisons of reported current and stated future method of payment shares support the use of the stated future approach as a basis for estimating models of future method of payment shares. The differences which exist, a somewhat lower stated future use of cash fares, may be due to statements in the survey suggesting a higher degree of availability of both tokens and passes than is currently the case or to overstatement of future use which is a common response to future choice questions. The effect of such overstatement will be offset by using information on current method of payment to adjust the models based on stated future choice.

5.3 Method of Payment Choice Model Structure

The sample respondents are assigned to seven market groups differentiated by full versus reduced fare riders and by type of pass, if any, which they chose to evaluate. The implicit assumption in this structure is that the respondents are able to decide the type of pass, if any, which is most appropriate for their use. The number and proportion of the respondents in each group was reported earlier in Table 11.

Multinomial logit models of token, pass and cash share are estimated separately for each of the five groups which indicate a pass selection. The general form of this model is:

$$[SHARE_{MP}] = \frac{\exp[UTILITY_{MP}]}{\exp[UTILITY_{C}] + \exp[UTILITY_{T}] + \exp[UTILITY_{P}]}$$

That is, the share expected to choose any method of payment (MP) is equal to the exponent of the utility of that method of payment divided by the sum of the exponents of the utility of each method of payment: cash (C), token (T) and pass (P). Thus, the same formula structure can be used for each method of payment by changing the utility function in the numerator. Further, alternative models can be represented by different utility functions.

Similarly, binomial logit models of token and cash share are estimated separately for the full and reduced fare rider groups which do not select any pass type. The general form of this model is:

$$[SHARE_{MP}] = \frac{\exp[UTILITY_{MP}]}{\exp[UTILITY_{C}] + \exp[UTILITY_{T}]}$$

Four distinct sets of variables are considered for inclusion in each method of payment choice model:

- The cost of CTA travel for each method of payment,
- Demographic characteristics of the traveler,
- CTA riding pattern of the traveler,
- The traveler's ratings of method of payment attributes.

Each model was estimated with a wide range of alternative specifications and the best specifications were selected for use in the next tasks of the study. The final specifications for all the pass - cash - token models (full and reduced fare groups for different pass types) are identical although there are differences in the parameter estimates. The final specifications for the two token - cash models, for full and reduced fare passengers are also identical and are consistent with the pass model specifications.

5.4 Pass - Cash - Token Models.

Pass - cash - token models were estimated for five groups of CTA riders. The initial model estimation was based on the future use statements made by respondents in the survey. The wide range of specifications considered was narrowed down after extensive testing. The results of these tests were remarkably similar across market groups. Three models were selected as candidates for use in the next tasks in this study. These models were applied to information on actual method of payment and adjusted to obtain the best representation of future method of payment, taking account of both stated future behavior and current behavior.

Section 5.4.1 describes the estimation and adjustment process for full fare riders responding to the every day pass questions, reports estimation results for a subset of the estimated models, describes the adjustment to take account of current method of payment behavior and reports the final model. Section 5.4.2 reports the parallel analysis for reduced fare riders for choice of every day pass, cash and token use. Section 5.4.3 reports the estimation of other pass type models and their adjustments based on the adjustments used for the every day pass models.

5.4.1 Pass - Cash - Token Models for Full Fare Riders Considering the Every Day Pass.

The first major specification issue is the method of representing the cost or fare by different methods of payment. Three alternative approaches were considered. First, the cost per month was computed for cash and token payment taking account of number of trips per week and share of trips requiring transfers. The formula for monthly cost for those who pay with tokens or cash is:

$$\text{MONTHLY COST} = 4.333 * \text{TRIP/WK} * (\text{FARE} + \text{SHTRAN} * \text{COSTTRAN})$$

where 4.333 is the average number of weeks per month,
TRIP/WK is number of CTA trips per week,
SHTRAN is the share of trips requiring transfer, and
COSTTRAN is the cost of a transfer.

Pass cost was taken as the one time cost of the monthly pass. This cost is modified for the weekday and peak only passes to add the per ride cost of trips taken outside of the pass period. This formulation provides the most realistic comparison of method of payment costs.

Second, the single ride cash and token costs were used for those methods of payment and the monthly cost of the pass was used for the pass alternative. In this approach the cost variables enter the model differently to take account of the differences in cost for single ride versus multiple ride methods of payment. This approach implies that passengers make a direct, intuitive assessment of cost comparisons rather than an analytic comparison of costs.

The third method is designed to take account of differences in the expected rate of substitution among methods of payment. Specifically, we expect that there is greater substitutability between cash and tokens than between either of these and passes. The formulation of the model is identical to the first model with the addition of a variable which represents the difference in monthly cost between cash and tokens.

The estimation results for each of the three model formulations described above are reported in Table 17.

Table 17
Estimation of Pass - Cash - Token Models
Full Fare Riders - Every Day Pass
Different Cost Specification

VARIABLE	MONTHLY COST	RIDE COST PASS COST	COST DIFFERENCE
MONTHLY COST	-0.007834		-0.006208
MONTHLY COST DIFFERENCE (TOKEN -CASH) - TOKENS			-0.006208
RIDE COST - CASH & TOKENS		-4.333	
PASS COST		-0.1431	
CONSTANT - TOKENS	-0.002738	-0.6745	0.001033
CONSTANT - PASS	0.2488	3.295	0.2161
LIKELIHOOD RATIO STAT	61.0	246.6	63.6

The monthly cost parameter applies to all alternatives. The RIDE COST parameter applies, as indicated, to the cash and token alternatives. The other parameters apply to the specific alternatives stated.

We use these models to illustrate how these estimation results are included in the general model described above. The utility of each method of payment for the MONTHLY COST model, based on the estimated parameters reported in the first column of Table 17, is:

$$\begin{aligned}\text{UTILITY}_C &= -0.007834 * [\text{MONTHLY COST}]_C \\ \text{UTILITY}_T &= -0.007834 * [\text{MONTHLY COST}]_T -0.002738 \\ \text{UTILITY}_P &= -0.007834 * [\text{MONTHLY COST}]_P +0.2488\end{aligned}$$

The corresponding utilities for the RIDE COST - PASS COST model are:

$$\begin{aligned}\text{UTILITY}_C &= -4.333 * [\text{TRIP COST}]_C \\ \text{UTILITY}_T &= -4.333 * [\text{TRIP COST}]_T -0.6745\end{aligned}$$

$$\text{UTILITY}_P = -0.1431 * [\text{MONTHLY COST}]_P +3.295$$

and the corresponding utilities for the COST DIFFERENCE model are:

$$\begin{aligned}\text{UTILITY}_C &= -0.006208 * [\text{MONTHLY COST}]_C \\ \text{UTILITY}_T &= -0.006206 * [\text{MONTHLY COST}]_T \\ &\quad -0.006208 * [\text{MONTHLY COST DIFFERENCE}]_T +0.001033\end{aligned}$$

$$\text{UTILITY}_P = -0.006208 * [\text{MONTHLY COST}]_P +0.2161$$

The cost parameters in all three models have the correct signs and are highly significant. (Note: the reported parameters for MONTHLY COST and MONTHLY COST DIFFERENCE in the COST DIFFERENCE model are equal due to constraints imposed on the equation.) These models support the expected relationship that increasing cost of a method of payment will decrease the extent to which it is chosen. The simplest cost comparison (method 2) obtained the best model results. However, since they represent different theories about travelers assessment of methods of payment, all three models are retained for consideration for adjustment to represent actual method of payment choice.

The next set of factors is the demographic characteristics of riders. Extensive testing of specifications including gender, race, income, automobile ownership and employment was undertaken. None of these variables significantly influence method of payment choice. These variables were excluded from the model.

The third set of factors is riding patterns. Riding patterns are implicitly included in the two monthly cost models, so they are considered for addition to the ride cost - pass cost model only. Extensive testing of CTA usage measures was made including trips and days per week (for both weekdays and weekends), share of trips by rail, share of trips requiring transfers and share of trips during the peak period. The only variable found to be significant was the number of CTA trips per week. The effect of including trips per week in the trip cost - pass cost model is shown in Table 18.

Table 18
Estimation of Pass - Cash - Token Models
Full Fare Riders - Every Day Pass and Trips per Week

VARIABLE	RIDE COST PASS COST TRIPS/WEEK
RIDE COST	-4.330
PASS COST	-0.1445
TRIPS/WEEK - TOKENS	-0.02610
TRIPS/WEEK - PASS	0.02744
CONSTANT - TOKENS	-0.3567
CONSTANT - PASS	3.028
LIKELIHOOD RATIO STAT	272.6

The inclusion of trips per week is important and significant. The negative sign for trips per week for tokens contradicts a priori expectations that both pass and token use would increase relative to cash use with number of rides per week. However, review of the data indicates that current token use does increase with increasing trip frequency to 6 to 10 trips per week but increases with further increases in trip frequency. Thus, this model replaces the ride cost - pass cost model reported earlier.

Finally, we consider the effect of ratings of pass and token attributes on their use. Table 19 presents these results for the MONTHLY COST model. The additional variables represent ratings for time savings, cheaper than cash, vendor access, advance cost not too much and convenience (all the ratings have been modified so that a higher number implies a more positive rating).

Table 19
Estimation of Pass - Cash - Token Models
Full Fare Riders - Every Day Pass
Inclusion of Attribute Ratings

VARIABLE	MONTHLY COST
MONTHLY COST	-0.006985
SAVE TIME	0.2618
CHEAPER THAN CASH	0.0895
VENDOR ACCESS	0.0495
ADVANCE COST NOT TOO MUCH	0.1060
CONVENIENT	0.1040
CONSTANT - TOKENS	-2.169
CONSTANT - PASS	-2.165
LIKELIHOOD RATIO STAT	132.8

The ratings variables all have a positive effect on method of payment usage as expected and their effect is highly significant. The relative importance of each attribute for full fare riders rating the every day pass is given in Table 20, in which the total is set equal to 100.

Table 20
Relative Importance of Token/Pass Attributes

SAVE TIME	42.9
CHEAPER THAN CASH	14.7
VENDOR ACCESS	8.1
ADVANCE COST NOT TOO MUCH	17.3
CONVENIENT	17.0

The most important attribute is saving time followed by advance cost not too much, convenient and cheaper than cash. Vendor access is much less important. Additional analyses, not reported here, indicate that these results are relatively stable over alternative model specifications.

The ratings variables are not included in the predictive model as they can not be readily predicted for future conditions. However, they indicate the characteristics of both passes and tokens which must be improved to obtain maximum usage when a program is implemented to increase use of these methods of payment.

The results obtained indicate that the models to be used for prediction should include some measure of cost and trip frequency. The models we consider for adoption in the prediction phase of these study include the MONTHLY COST and the COST DIFFERENCE models which implicitly include trip frequency and transfer shares and the RIDE COST - PASS COST - TRIPS/WEEK model which explicitly includes trip frequency.

The next task is to apply these models to the actual method of payment behavior and adjust them, as necessary, to represent expected future choice of method of payment. This is done by computing the utility of each alternative using the utility function from the estimated future choice models and incorporating this utility in a model which estimates a scale adjustment parameter and additional alternative specific constants.

The estimation results for the scale parameter for the utility variables and for the alternative specific constants are reported in Table 21.

Table 21
Estimation of Pass - Cash - Token Models
Full Fare Riders - Every Day Pass
Adjustment for Actual Choice

VARIABLE	MONTHLY COST	RIDE COST PASS COST	COST DIFFERENCE
MONTHLY COST UTILITY	1.697		
RIDE COST - PASS COST TRIPS/WEEK UTILITY		2.315	
COST DIFFERENCE UTILITY			2.139
CONSTANT - TOKENS	-2.521	-1.599	-2.572
CONSTANT - PASS	-1.206	-1.705	-1.232
LIKELIHOOD RATIO STAT	163.7	162.9	163.7

The utility parameters are highly significant in all three models and have the correct sign. The negative constants for both tokens and passes indicate that, as expected, the actual adoption of tokens and passes will be less extensive indicated by responses to the stated future choice questions. These parameters adjust for respondent overstatement and bring the original models into a framework which enables them to be used for prediction of future method of payment choice behavior. All three models have almost identical overall fit statistics. There is little basis to choose between them on statistical grounds although the MONTHLY COST and COST DIFFERENCE models are slightly superior to the RIDE COST - PASS COST -TRIPS/WEEK model.

This result is particularly interesting in view of the superiority of the RIDE COST - PASS COST - TRIPS/WEEK model in the future choice analysis described earlier. In that case, the model based on the simplest comparison of costs was superior. However, when adjusted for actual behavior, all three models are similar. We recommend adoption of the model based on COST DIFFERENCE because of its closer representation of the cost comparison process which we believe is used in long term evaluation of alternative methods of payment and its recognition that the comparison between cash and tokens is different from the comparison between either of these trip based methods of payment and passes. This model includes number of trips as a multiplier of costs rather than as a separate additive variable. This model also includes transfer costs and the use of transfers as they affect method of payment choice.

The final selected model incorporates the results of the original estimations and the adjustments into a single model. The utility function of this model is:

$$\begin{aligned} \text{UTILITY}_C &= 2.139 * \{-0.006208 * [\text{MONTHLY COST}]_C\} \\ &= -0.01328 * [\text{MONTHLY COST}]_C \end{aligned}$$

$$\begin{aligned} \text{UTILITY}_T &= 2.139 * \{-0.006208 * [\text{MONTHLY COST}]_T \\ &\quad -0.006208 * [\text{MONTHLY COST DIFFERENCE}]_T +0.001033\} \\ &\quad -2.572 \\ &= -0.01328 * [\text{MONTHLY COST}]_T \\ &\quad -0.01328 * [\text{MONTHLY COST DIFFERENCE}]_T -2.570 \end{aligned}$$

$$\begin{aligned} \text{UTILITY}_P &= +2.139 * \{-0.006208 * [\text{MONTHLY COST}]_P +0.2161\} \\ &\quad -1.232 \\ &= -0.01328 * [\text{MONTHLY COST}]_P -0.7698 \end{aligned}$$

5.4.2 Pass - Cash - Token Models for Reduced Fare Riders Considering the Every Day Pass.

The estimation of the pass - cash - token model for reduced fare riders who evaluated the every day pass was undertaken in the same fashion as for the full fare riders. The results at every stage of the estimation process were remarkably similar except that specific parameters values differed and the overall goodness of fit statistics were somewhat poorer (due to the smaller sample). The future choice models used in the final estimation are shown in Table 22.

Table 22
Estimation of Pass - Cash - Token Models
Reduced Fare Riders - Every Day Pass

VARIABLE	MONTHLY COST	RIDE COST PASS COST TRIPS/WEEK	COST DIFFERENCE
MONTHLY COST	-0.004949		-0.005863
COST DIFFERENCE (TOKENS - CASH) - TOKENS			-0.005863
RIDE COST		-2.825	
PASS COST		-0.2218	
TRIPS/WEEK - TOKENS		0.02886	
TRIPS/WEEK - PASS		0.00827	
CONSTANT - TOKENS	-0.1497	-0.6507	-0.1516
CONSTANT - PASS	0.4725	4.659	0.4375
LIKELIHOOD RATIO STAT	27.9	76.8	29.8

All the cost variables are negative, as expected; however, the monthly cost variable is not significant in the MONTHLY COST model but is in the COST DIFFERENCE model. The trips per week variable in the second model is positive for both tokens and pass use and significant for token use. The MONTHLY COST and COST DIFFERENCE models are substantially less significant than the RIDE COST - PASS COST - TRIPS/WEEK model. As before, we retain all three models for adjustment based on actual method of payment.

The adjustment for actual choice behavior is accomplished by formulating utility values from each model and including them in an actual choice model. The estimation results for the actual choice models are presented in Table 23.

Table 23
Estimation of Pass - Cash - Token Models
Reduced Fare Riders - Every Day Pass
Adjustment for Actual Choice

VARIABLE	MONTHLY COST	RIDE COST PASS COST TRIPS/WEEK	COST DIFFERENCE
MONTHLY COST UTILITY	2.815		
RIDE COST - PASS COST - TRIPS/WEEK UTILITY		-0.4968	
COST DIFFERENCE UTILITY			2.451
CONSTANT - TOKENS	-1.716	-2.621	-1.766
CONSTANT - PASS	-2.328	-0.6135	-2.079
LIKELIHOOD RATIO STAT	79.3	57.5	79.8

The utility cost parameters in the first and third models have the correct sign and are significant. The parameter for the RIDE COST - PASS COST -TRIPS/WEEK model is not significant and has the wrong sign. As with the full fare models, the constants are negative. In this case, the fit statistics between the three models are different and the difference is large enough to reject the RIDE COST - PASS COST -TRIPS/WEEK model in favor of either of the other models. We select the COST DIFFERENCE model because it takes account of the differences in comparison between cash and tokens and between these ride base methods of payment and passes. These results are consistent with the earlier decision to adopt the COST DIFFERENCE model for full fare riders.

The final selected model incorporates the results of the original estimations and the adjustments into a single model. The utility function of this model is:

$$\begin{aligned} \text{UTILITY}_C &= 2.451 * \{-0.005863 * [\text{MONTHLY COST}]_C\} \\ &= -0.01437 * [\text{MONTHLY COST}]_C \end{aligned}$$

$$\begin{aligned} \text{UTILITY}_T = 2.451 * \{&-0.005863 * [\text{MONTHLY COST}]_T \\ &-0.005863 * [\text{MONTHLY COST DIFFERENCE}]_T -0.01516\} \\ &-1.766 \\ = &-0.01437 * [\text{MONTHLY COST}]_T \\ &-0.01437 * [\text{MONTHLY COST DIFFERENCE}]_T -1.803 \end{aligned}$$

$$\begin{aligned} \text{UTILITY}_P = 2.451 * \{&-0.005863 * [\text{MONTHLY COST}]_P +0.4375\} \\ &-2.070 \\ = &-0.01437 * [\text{MONTHLY COST}]_P -0.9977 \end{aligned}$$

This final model is remarkably similar to the corresponding model for full fare riders. While we did not necessarily expect such close correspondence between these models, it does give increased confidence in the results.

5.4.3 Pass - Cash - Token Models for Other Rider Groups and Pass Types.

Similar future choice models were estimated for the samples which responded to future usage questions for other pass types. These are full fare riders who considered weekday and peak only passes and reduced fare riders who considered weekday passes. The estimation results for COST DIFFERENCE models for these groups are given in Table 24.

Table 24
Estimation of Pass - Cash - Token Models
Cost Difference Models
Other Pass Groups

VARIABLE	FULL FARE WEEK DAY PASS	FULL FARE PEAK ONLY PASS	REDUCED FARE WEEK DAY PASS
MONTHLY COST	-0.009386	-0.01596	-0.005111
COST DIFFERENCE (TOKEN - CASH)	-0.009386	-0.01596	-0.005111
CONSTANT - TOKENS	0.4340	0.2278	0.1994
CONSTANT - PASS	-0.07180	0.1172	0.1651
LIKELIHOOD RATIO STAT	51.8	56.8	4.4

The cost parameters for both full fare groups have the correct sign and are significant. The cost parameters for the reduced fare weekday pass model are negative but very small and not significant. This model has very limited explanatory power and is not significant. However, it is the best model which can be obtained from the available data. Thus, we adopt these three models as the base for developing the final models for these three groups of CTA users in the next sub-section.

The final pass models for full and reduced fare passengers are obtained by applying the adjustment estimated for the full and reduced fare every day pass models to the remaining models. This is done for the full fare week day and peak pass models as for the full fare every day pass model in section 5.4.1 and for the reduced fare week day pass model as for the reduced for every day pass model in section 5.4.2.

The resultant full fare and reduced fare models are shown in Tables 25 and 26, respectively.

Table 25
Final Pass - Cash - Token Models
Full Fare Riders

VARIABLE	EVERY DAY PASS	WEEK DAY PASS	PEAK ONLY PASS
MONTHLY COST	-0.0133	-0.0156	-0.0341
COST DIFFERENCE (TOKENS - CASH)	-0.0133	-0.0156	-0.0341
CONSTANT - TOKENS	-2.570	-1.644	-2.085
CONSTANT - PASS	-0.7698	-1.380	-0.9813

Table 26
Final Pass - Cash - Token Models
Reduced Fare Riders

VARIABLE	EVERY DAY PASS	WEEK DAY PASS
MONTHLY COST	-0.01437	-0.01253
COST DIFFERENCE (TOKEN - CASH)	-0.01437	-0.01253
CONSTANT - TOKENS	-1.803	-1.277
CONSTANT - PASS	-0.9977	-1.665

The models reported in Tables 25 and 26 are proposed for use to predict future method of payment for full and reduced fare riders, respectively.

5.5 Token - Cash Models for Respondents Who Were Not Willing to Make Future Pass - Cash Choices

A group of full and reduced fare riders (123 and 78 persons, respectively) refused to evaluate any of the pass alternatives. We consider these people to represent confirmed non-pass riders. Models of the choice between cash and token were estimated for these passengers. The model estimation was undertaken in two stages as was done for the pass - cash - token models. The initial model estimation was based on the future use statements made by respondents in the survey. A wide range of specifications was considered and narrowed down after extensive testing. Three models were selected as candidates. These models were subsequently applied to information on actual method of payment and adjusted to obtain the best representation of future method of payment taking account of both stated future behavior and current behavior.

The same major specification types were considered for the token - cash models as for the token - cash - pass models. These included the method of including cost and the effect of travel characteristics, demographic characteristics and token attribute ratings on method of payment choice. Three final models were selected based on different ways in which to include cost and trips per week. These models are reported in Table 27.

Table 27
Estimation of Cash - Token Models
for Full Fare Riders

VARIABLE	MONTHLY COST	RIDE COST	RIDE COST TRIPS/WEEK
MONTHLY COST	-0.05181		
TRIP COST		-5.350	-5.350
TRIPS/WEEK - TOKENS			0.0134
CONSTANT - TOKENS	-0.81751	1.431	-1.544
LIKELIHOOD RATIO STAT	36.9	36.9	37.4

The cost parameters in all three models have the correct sign and are highly significant. These models support the expected relationship that increasing cost of a method of payment will decrease the extent to which it is chosen. The models based on monthly and per ride cost obtained the same statistical results. The addition of trips per week to the ride cost model is positive but not statistically significant.

The effect of ratings of token attributes on their use in this case of token - cash choice was tested for the MONTHLY COST model. These results are reported in Table 28.

Table 28
Estimation of Cash - Token Models for Full Fare Riders
Inclusion of Attribute Ratings

VARIABLE	MONTHLY COST
MONTHLY COST	-0.04760
SAVE TIME	0.2452
CHEAPER THAN CASH	0.2156
VENDOR ACCESS	0.3534
ADVANCE COST NOT TOO MUCH	-0.0199
CONVENIENT	0.4454
CONSTANT - TOKENS	-5.283
LIKELIHOOD RATIO STAT	58.9

The ratings variables all have a positive effect on method of payment usage with the exception of "advance cost (not) too much" which is not significant and can be considered to have no effect. The relative importance of each of the remaining attributes based on the monthly cost model is given in Table 29 in which the total is set equal to 100.

Table 29
Relative Importance of Token Attributes
Full Fare Riders - No Pass

SAVE TIME	19.5
CHEAPER THAN CASH	17.1
VENDOR ACCESS	28.0
ADVANCE COST NOT TOO MUCH	0.0
CONVENIENT	35.4

The most important attributes in this case are "convenient to use" and "(not) difficult to find". These results contrast to those obtained for pass - cash - token choice in which "saving time" was most important. These differences are reasonable considering the lower cost per purchase for tokens than for passes.

The results obtained indicate that the models to be used for prediction should include some measure of cost and trip frequency as reported in Table 27 for full fare riders. The estimation results for the corresponding models for reduced fare riders are reported in Table 30.

Table 30
Estimation of Cash - Token Models for Reduced Fare Riders

VARIABLE	MONTHLY COST	RIDE COST	RIDE COST TRIPS/WEEK
MONTHLY COST	-0.09336		
TRIP COST		-8.997	-8.654
TRIPS/WEEK - TOKENS			0.0418
CONSTANT - TOKENS	-1.217	-1.637	-1.975
LIKELIHOOD RATIO STAT	50.1	59.2	73.7

These results are similar to those for the full fare passengers except that the cost parameters are larger in magnitude indicating a higher sensitivity to token vs. cash fare differences and that the effect of trips per week is somewhat larger and significant.

The next task is to apply the models reported in Tables 27 and 30 to the actual method of payment behavior and adjust them, as necessary, to represent expected future choice of method of payment. This is done in the same fashion as for the pass - cash - token models. However, this approach cannot be made for the ride cost models (with or without trips per week) as the single ride token and cash payment costs do not vary among respondents. Further, we are not able to estimate any of the token - cash models for the reduced fare riders due to the small sample size. Thus, we can estimate the monthly cost adjusted model for full fare riders only. The estimation results for the scale parameter for the utility variables and for the alternative specific constant are reported in Table 31.

Table 31
Estimation of Token - Cash Models Adjustment for Actual Choice

VARIABLE	FULL FARE RIDERS
MONTHLY COST UTILITY	6.521
CONSTANT - TOKENS	2.399
LIKELIHOOD RATIO STAT	66.3

The utility parameter is large but not significant giving us little confidence in the reliability of this model. In order to obtain a model for reduced fare riders and increase the consistency among models, we adopt an approach to adjustment which is the same as that used for the pass - cash - token models for other than every day passes. That is, we apply the scale adjustment obtained from the every day pass models to the token - cash models and re-estimate the token constant to match correctly the current and expected share of token use. The way in which the final token - cash models are obtained is shown in the following equations:

Full fare passenger token - cash model:

$$\begin{aligned} \text{UTILITY}_C &= 2.139 * \{-0.05181 * [\text{Monthly Cost}]_C\} \\ &= -0.1108 * [\text{Monthly Cost}]_C \end{aligned}$$

$$\begin{aligned} \text{UTILITY}_T &= 2.139 * \{-0.05181 * [\text{Monthly Cost}]_T - 0.8175\} - 1.232 \\ &= -0.1108 * [\text{Monthly Cost}]_T - 2.981 \end{aligned}$$

Reduced fare passenger token - cash model:

$$\begin{aligned} \text{UTILITY}_C &= 2.451 * \{-0.09336 * [\text{Monthly Cost}]_C \\ &= -0.2288 * [\text{Monthly Cost}]_C \end{aligned}$$

$$\begin{aligned} \text{UTILITY}_T &= 2.451 * \{0.09336 * [\text{Monthly Cost}]_T - 1.217) - 2.070 \\ &= -0.2288 * [\text{Monthly Cost}]_T - 5.053 \end{aligned}$$

These models are proposed for use to predict future method of payment for those full and reduced fare riders, respectively, who express a lack of interest in future pass use. The use of these models is based on computation of monthly cost to represent changes in fare structure and takes account of the different riding patterns of different individuals. These models use the same variables and have the same structure as the pass - cash - token models described in section 5.4.

5.6 Summary of Models Selected for Prediction of Future Method of Payment

Two sets of models were selected for use in this analysis. First are five models which predict choice of method of payment among cash, tokens and pass. These models are differentiated by the rider group, full or reduced fare, and the type of pass considered. Models are obtained for full fare riders for every day, week day and peak only passes and for reduced fare riders for every day and week day passes. These five models are based on the multinomial logit formulation reported in section 5.3 and repeated here for convenience:

$$[SHARE_{MP}] = \frac{\exp[UTILITY_{MP}]}{\exp[UTILITY_C] + \exp[UTILITY_T] + \exp[UTILITY_P]}$$

The utility functions for each model are as follows. The utility functions for the full fare every day pass model are:

$$UTILITY_C = -0.01328 * [MONTHLY\ COST]_C$$

$$UTILITY_T = -0.01328 * [MONTHLY\ COST]_T - 0.01328 * [MONTHLY\ COST\ DIFFERENCE]_T - 2.570$$

$$UTILITY_P = -0.01328 * [MONTHLY\ COST]_P - 0.7698$$

The utility functions for the full fare weekday pass model are:

$$UTILITY_C = -0.0201 * [MONTHLY\ COST]_C$$

$$UTILITY_T = -0.0201 * [MONTHLY\ COST]_T - 0.0201 * [MONTHLY\ COST\ DIFFERENCE]_T - 1.644$$

$$UTILITY_P = -0.0201 * [MONTHLY\ COST]_P - 1.386$$

The utility functions for the full fare peak only pass model are:

$$UTILITY_C = -0.0341 * [MONTHLY\ COST]_C$$

$$UTILITY_T = -0.0341 * [MONTHLY\ COST]_T - 0.0341 * [MONTHLY\ COST\ DIFFERENCE]_T - 2.085$$

$$UTILITY_P = -0.0341 * [MONTHLY\ COST]_P - 0.9813$$

There are two models for token - cash choice for individuals who do not consider any pass option. These models ar based on the binomial logit formulation as follows:

$$[SHARE_{MP}] - \frac{\exp[UTILITY_{MP}]}{\exp[UTILITY_{C}] + \exp[UTILITY_{T}]}$$

The utility functions for the full fare token - cash model are:

$$UTILITY_C = -0.1108 * [\text{Monthly Cost}]_C$$

$$UTILITY_T = -0.1108 * [\text{Monthly Cost}]_T - 2.981$$

The utility functions for the reduced fare passenger token - cash model:

$$UTILITY_C = -0.2288 * [\text{Monthly Cost}]_C$$

$$UTILITY_T = -0.2288 * [\text{Monthly Cost}]_T - 5.053$$

5.7 Summary of Method of Payment Choice Analysis

The CTA ridership sample and the population of CTA riders which it represents is divided into seven market segments based on eligibility for reduced fare payment and the type of pass considered for future pass use. These segments are identified and the portion of the full and reduced fare rider sample in each segment given in Table 11. Each group is presumed to consider future method of payment among cash, token and whatever pass type in which they expressed interest (or no pass).

Models of future method of payment are estimated for each group through a two stage process. The first stage is based on stated future method of payment choice for pairwise comparisons between tokens and cash and between passes and cash. These estimations, (based on a range of prices for each method of payment) provide a useful basis for estimation of sensitivity to method of payment cost. The final models from this stage include variables which incorporate the costs of each method of payment and some measure of CTA usage.

The second stage consists of adjustment of the first stage models to take account of expected differences between stated future method of payment and actual future method of payment. This is accomplished by applying the utility values obtained from the first stage models to models of actual method of payment choice for current CTA fares. These models could not be estimated for choice of passes other than the every day pass because such passes are not currently available. Further, these models could not be estimated for the token - cash choice due to sample size and related statistical reasons. The models estimated for choice of every day pass - cash - token choice for both full and reduced fare riders were applied to the first stage models for all market segments for full and reduced fare riders, respectively, to adjust those models for differences between stated and expected future choices.

The final models are reported in section 5.6. These models are recommended for use in predicting future method of payment for alternative fare structure scenarios.

The effect of pass and token attribute ratings on method of payment choice was also estimated. The relative importance of different attributes was reported in Table 20 for pass - cash - token choice and in Table 29 for token - cash choice. The relative importance of different attributes provides useful information to the CTA for designing the distribution and promotion of passes and tokens to obtain the most usage of these methods of payment. Specifically, the relative importance measures indicate that attention should be given to improving and promoting the time savings and convenience advantages of pass and token use and improving their availability.

6. Prediction of the Effect of Fare Structure Changes on Method of Payment Shares

The models for method of payment developed in section 5 will be used in Task 3 to predict changes in method of payment shares and revenues for different fare structure proposals. The prediction process will be based on a sample enumeration approach in which the choice probability for each method of payment is predicted for each respondent and these are expanded and summed to obtain the expected total demand for each method of payment. The sample enumeration procedure provides the best estimates of future use of each method of payment.

In this section, we use an approximate approach based on average ridership characteristics for four groups of full fare riders identified by the type of pass they were willing to consider as an alternative to cash or tokens or their unwillingness to consider any pass type.

We make three sets of predictions each based on a different fare structure. The sample of full fare riders is divided into four groups based on their willingness to consider different types of passes or no pass. The average number of trips per month for each set of predictions is assumed to be 55 for the Every Day Pass group, 50 for the Weekday Pass group, 40 for the Peak Only Pass group and 30 for the Non-Pass group. Within each group, we assume that 40% of all trips require a transfer.

The first set of predictions is based on current fares. The estimated shares for each group are shown in Table 32.

Table 32
Predictions of Method of Payment Shares
Current Fare Structure

Method of Payment Shares	EVERY DAY PASS GROUP	WEEK DAY PASS GROUP	PEAK ONLY PASS GROUP	TOKEN GROUP
Pass Share	0.337	0.190	0.219	
Cash Share	0.609	0.655	0.671	0.899
Token Share	0.054	0.155	0.110	0.101

These predictions, which are not exact due to use of the approximate prediction procedure, provide a reference point against which to compare the effect of changes in fare structure on method of payment choice shares.

The second set of predictions is based on the assumption that weekday passes are available at $40 and that peak only passes are available at $35. The resultant shares are shown in Table 33.

Table 33
Predictions of Method of Payment Shares
Current Fare Structure with New Passes

Method of Payment Shares	EVERY DAY PASS	WEEK DAY PASS	PEAK ONLY PASS	TOKEN
Pass Share	0.337	0.223	0.319	
Cash Share	0.609	0.628	0.585	0.899
Token Share	0.054	0.174	0.106	0.101

This table indicates an expected increase in pass usage from adoption of alternative pass types. This increase is substantial for the two groups which consider passes which allow unlimited riding during selected time periods.

The third set of predictions is based on an increase in cash fare from $1.00 to $1.10. The estimated effect of this increase in cash fare with no change in pass or token cost is shown in Table 34.

Table 34
Predictions of Method of Payment Shares
Increased Cash Fare with New Passes

Method of Payment Shares	EVERY DAY PASS	WEEK DAY PASS	PEAK ONLY PASS	TOKEN
Pass Share	0.350	0.234	0.340	
Cash Share	0.589	0.595	0.544	0.872
Token Share	0.064	0.207	0.132	0.128

This table indicates the potential for a substantial increase in pass and token usage as a result of modest increases in the cash fare (with other charges held fixed). The estimated increase in pass usage ranges from 4 to 6% and in token usage ranges from 20 to 30% for different groups (obtained by dividing pass/token shares in Table 34 by the corresponding shares in Table 33). These results provide an indication of the potential to increase use of non-cash methods of payment by introduction of a range of pass types and increasing the discount of alternative methods of payment relative to cash.

7. CONCLUSIONS

This study identified monthly cost as the most important factor in choice of method of payment. Monthly cost includes the effect of differences in riding patterns by including CTA usage frequency and percent of trips made with transfers in the computation of monthly cost for each respondent. Demographic characteristics were not found to have any substantial impact on choice of method of payment. The models selected consider cost differently for different methods of payment to account for the higher rate of substitution between cash and tokens than between either of these ride-based methods of payment and passes.

The selected models based on monthly cost and monthly cost difference are used in Task 3 to develop predictions of the future share of method of payment for selected fare structure scenarios. However, an example was presented to illustrate the potential for increased adoption of non-cash methods of payment. This example indicates substantial potential for increased use of passes through the adoption of a wider range of pass types which enable lower pass prices to be offered for passes with restricted time periods of use. It also indicates a substantial potential for increased use of passes and tokens through increases in the price differential between cash and alternative methods of payment.

The study also examined the influence of respondents ratings of token and pass attributes on their utilization of these methods of payment. Among respondents who considered passes as well as tokens, "save time", "more convenient than cash" and "advance cost not too high" were the most important factors. Among respondents who considered tokens and cash only, "convenience" and "vendor access" were most important. These findings indicate that these attributes should be the focus of new policies to increase pass and token use in addition to changes made in the fare structure.

APPENDIX 1

QUESTIONNAIRE

CTA FARES STUDY
QUESTIONNAIRE

INTRODUCTION

Hello, I am calling from Martinez Associates. We are doing a study of transportation for the Chicago Transit Authority. We would like to ask you a few questions about transportation service and your travel in the Chicago area. Your answers will be used by the CTA to make improvements in transportation service.

First, I need to ask you a few question about your household and their travel in the Chicago area.

1. How many persons age 12 or over live in your household including yourself?

Record number ______
99 Refused [Terminate] F11-12

2. Thinking about these people, how many of them, including yourself, used the CTA bus, el or subway during the past week?

0 None [Non-rider household, Terminate]
Record number ______
99 Refused [Terminate] F13-14

3. Did you ride the CTA during the last week?

0 No [Go to 3A]
1 Yes [Go to 4 on next page] F15

3A. May I please speak to one of the people (the person) in your household who used CTA during the last week?

0 No, refusal [Terminate]
1 Not at home [Arrange time for call back]
2 Yes [Continue] F16

****

Repeat introduction if necessary

****

Hello, I am calling from Martinez Associates. We are doing a study of transportation for the Chicago Transit Authority. We would like to ask you a few questions about transportation and your travel in the Chicago area. Your answers will be used by the CTA to make improvements in transportation service.

First, we would like to know about your use of CTA.

4. Please tell us how many days you used CTA in the last 7 days. [Ask respondent to estimate if necessary]

0 None [Terminate]
Record number _____ [Acceptable responses: 1 to 7]
[If 7, Go to 6]

9 Refused [Terminate] F17

5. How many of these days were weekdays, Monday through Friday? [Ask respondent to estimate if necessary]

0 None [Go to 9]
Record number _____ [Acceptable responses are 1 to 5]
9 Refused [Terminate] F18

6. Now, think about the last weekday when you rode CTA. How many one-way trips did you make by CTA that day? Please count each time you went someplace or returned as one trip. For example, a trip to work and back is two trips. [Ask respondent to estimate if necessary]

Record number ______ [If 1, remind respondent to count
99 Refused [Terminate] trips to places and return as two]
F19-20

7. When you traveled by CTA that day, how many of your CTA trips were taken in each of the following ways. [Total of 7.1, 7.2, 7.3 and 7.4 should equal response to 6.]

7.1 First, how many trips were by a single bus ride with no transfers?
[Record number _______] F21-22

7.2 Second, how many trips were by bus with a transfer to one or more other buses?
[Record number _______] F23-24

7.3 How many trips were by rail (el or subway) with a transfer to or from one or more buses?
[Record number _______] F25-26

7.4 How many trips were by rail only?
[Record number ______] F27-28

7.5 [If respondent mentions trips by paratransit, Dial-A-Ride or Disabled Transit, mark here ______ and TERMINATE] F29

8. Also, when you traveled by CTA that day, how many of your CTA trips were taken during the morning and evening peak periods from 6 a.m. to 10 a.m. and from 3 p.m. to 7 p.m.

0 None
Record number ______ [Should be less than Quest 6]
99 Refused F30-31

9. Now, thinking about last weekend, how many trips did you make by CTA, counting both Saturday and Sunday. [Ask respondent to estimate if necessary]

0 None
Record number _______ F32-33
99 Refused

10. Generally, how has your CTA usage changed in the last year? Has it ...

1 Increased
2 Decreased
3 Stayed about the same
4 New rider [Do not read] F34
8 Don't know
9 Refused

Next, we would like to ask some questions about how you pay for your travel by CTA.

11. Are you eligible for a reduced fare as a student, Sr. Citizen or Disabled person? [Record on cover page also]

0 No .... [Full fare]
1 Student)
2 Elderly) .... [Reduced fare]
3 Disabled)
F35

Please think about how you paid for your travel by CTA during the last three months.

12. First, did you use a CTA monthly or 14-day pass during the last three months?

0 No [Go to 16]
1 Yes - Monthly [Ask 13 & 15]
2 Yes - 14-day [Ask 14 & 15]
3 Yes - Both [Ask 13, 14 & 15]

Do not read:
5 CTA Employee Pass [Terminate]
6 Free rider pass (Uniformed police, etc.) [Terminate]

8 Don't know F36
9 Refused

13. How many times did you purchase a monthly pass, in the last three months?

Record number _______ [Acceptable response: 1 to 4] F37

0 None
[Did someone else buy a pass for you? ____ If yes, How many passes did they buy for you in the last three months?]

Record number _______

F38

9 Refused

14. How many times did you purchase a 14-day pass, in the last three months?

Record number _______ [Acceptable response: 1 to 7] F39

0 None
[Did someone else buy a pass for you? ____ If yes, How many passes did they buy for you in the last three months?]

Record number _______

F40

9 Refused

15. Where was your pass purchased? [Accept up to three responses]

1 Place of employment
2 Grocery store / supermarket
3 Currency exchange F41
4 Bank F42
5 From friend or family member F43
6 Other
7 Don't remember
9 Refused / Don't know

16. Did you use CTA tokens any time during the last three months?

1 No [Go to 21]
2 Yes [Continue] F44

17. How many times did you purchase tokens during the last three months? [Ask respondent to estimate if necessary]

Record number ________ F45-46

0 None
[Did someone else buy tokens for you? ____ If yes, How many times did they buy tokens for you in the last three months?]

Record number ________ F47-48

99 Refused

18. How many tokens (single tokens or packs of tokens) do you usually buy at one time?

Single tokens .... Record number _________ F49-50
OR
Packs of tokens .. Record number _________ F51
[Note: Full fare riders buy packs of 10,
Reduced fare riders buy packs of 20]

9 Refused/Don't know F52

19. Where were your tokens purchased? [Accept up to three responses]

1 Place of employment
2 Grocery store / supermarket
3 Currency exchange
4 Bank F53
5 From friend or family member F54
6 Other F55
7 Don't remember
9 Refused / Don't know

20. When you used tokens, about how often did you pay additional cash for a transfer?

1 Never
2 Some of the time
3 About half the time F56
4 Most of the time
5 All the time
9 Refused/Dont know

21. About how many times did you use cash only to pay your CTA fare during the last three months? [Ask respondent to estimate if necessary]

F57

1 Never
2 Some of the time
3 About half the time
4 Most of the time
5 All the time
9 Refused / Dont know

RATINGS OF TOKEN AND PASS PAYMENT

Thank you for that information. Now we would like you to rate some aspects of using tokens and passes to pay your CTA fare. I am going to make some statements about using CTA tokens. Please tell me if you strongly agree, agree, neither agree not disagree, disagree or strongly disagree with each statement.

	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE	
22. Tokens save time paying the fare	1	2	3	4	5	F58
23. Tokens are much cheaper than paying cash	1	2	3	4	5	F59
24. It is hard to find a place to buy tokens	1	2	3	4	5	F60
25. Packs of tokens require me to pay too much money in advance	1	2	3	4	5	F61
26. Tokens are more convenient to use than cash	1	2	3	4	5	F62

Now, I'm going to make some statements about passes. Please tell me me if you strongly agree, agree, neither agree not disagree, disagree or strongly disagree with each statement.

	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DIS	
27. Passes save time paying the fare	1	2	3	4	5	F63
28. Passes are much cheaper than paying cash	1	2	3	4	5	F64
29. It is hard to find a place to buy passes	1	2	3	4	5	F65
30. Passes require me to pay too much money in advance	1	2	3	4	5	F66
31. Passes are more convenient to use than cash	1	2	3	4	5	F67
32. I would like to be able to use a credit card to buy my monthly pass	1	2	3	4	5	F68

ROUTING INSTRUCTION BASED ON RESPONSE TO QUESTION 11 ON PAGE 4

[Full fare - go to G33 on Goldenrod Page]
[Reduced fare - go to P33 on Pink Page]

Token questions for full fare rider.

The CTA is thinking about reducing the price of tokens. We would like you to tell us whether you would use tokens in place of cash under different conditions. First, think about buying single trip tokens in packs of ten available at local banks, currency exchanges and grocery stores.

G33. If the cash fare were to stay at $1.00 plus $.25 for a transfer and the tokens cost $7.50 for ten rides plus $.25 for a transfer, how likely would you be to buy the tokens? Would you ...

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F69
4 Probably not buy tokens?
5 Definitely not buy tokens? [Go to G37 on next page]
6 Don't know [Do not read]

G34. And if the tokens cost $8.50 for ten, how likely would you be to buy the tokens? Would you ...

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F70
4 Probably not buy tokens?
5 Definitely not buy tokens? [Go to G37 on next page]
6 Don't know [Do not read]

G35. And if the tokens cost $9.50 for ten, how likely would you be to buy the tokens?

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F71
4 Probably not buy tokens?
5 Definitely not buy tokens?
6 Don't know [Do not read]

G36. Now, if the cash fare were increased to $1.25 plus $.25 for a transfer and the tokens cost $9.50 for ten, how likely would you be to buy the tokens?

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F72
4 Probably not buy tokens?
5 Definitely not buy tokens?
6 Don't know [Do not read]

ROUTING INSTRUCTIONS FOR PASS TYPE FOR FULL FARE RIDERS

G37. The CTA is thinking about expanding its pass program by adopting three different types of monthly passes for people with different travel needs.

* The "Every Day" monthly pass will allow unlimited travel any time of the day or week at a substantial discount.

* The "Weekday" pass will allow unlimited travel on weekdays only and will be much cheaper than the "Every Day" pass.

* The "Peak Only" pass will allow travel only during the rush hours from 6 a.m. to 10 a.m. and 3 p.m. to 7 p.m. weekdays and will be much cheaper than the "Weekday" pass.

We would like to know which of these passes you might consider buying. Would you consider buying ...

1 The "Every Day" pass,	[Go to Blue 41]	
2 The "Weekday" pass, or	[Go to Red 41]	F73
3 The "Peak Only" pass.	[Go to Yellow 41]	

[If multiple responses, use first response given]
[If no selection say:

We would still like to ask you some questions about passes. Which pass would you be willing to answer questions about?

1 The "Every Day" pass,	[Go to Blue 41]	
2 The "Weekday" pass, or	[Go to Red 41]	F74
3 The "Peak Only" pass.	[Go to Yellow 41]	
9 None Wouldn't buy any pass	[Go to D1]	

PASS USAGE QUESTIONS FOR FULL FARE RIDER: "EVERY DAY" PASS

Now, we would like you to tell us whether you would use an "Every Day" monthly pass or cash to pay for your CTA trips under different conditions. Remember, the "Every Day" monthly pass will allow you to travel as much as you wish any day and at any time of day. The pass will be easy to buy at a local bank, currency exchange or grocery store.

B41. If the cash fare were to stay at $1.00 plus $.25 for a transfer and the pass costs $40.00 per month, how likely would you be to buy the pass? Would you...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F75
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

B42. And if the pass costs $50.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F76
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

B43. And if the pass cost $60.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F77
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

B44. Now, if the CTA fare were to increase to $1.25 plus $.25 for a transfer and the pass cost $60.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F78
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

B45. Now, please tell me; if you were to buy a pass, how would you prefer to buy it? Would you prefer to buy it ...

[Accept up to three responses]

1 By mail?
2 At your place of employment? F79
3 At a local store? F80
4 At a bank? F81
5 At a currency exchange?
6 Other

B46. Now we would like to know whether you would prefer to use the "Every Day" monthly pass or tokens to pay your CTA fares. If the "Every Day" pass cost $50 and each token cost $.85, how likely would you be to buy the "Every Day" pass? Would you ...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass?
4 Probably not buy a pass? F82
5 Definitely not buy a pass?
6 Don't know [Do not read]

[Go to D1]

PASS USAGE QUESTIONS FOR FULL FARE RIDER: "WEEKDAY" PASS

Now, we would like you to tell us whether you would use a "Weekday Only" monthly pass or cash to pay for your CTA trips under different conditions. Remember, the "Weekday Only" pass will allow you unlimited travel on weekdays only. The pass will be easy to buy at a local bank, currency exchange or grocery store.

R41. If the cash fare were to stay at $1.00 plus $.25 for a transfer and the pass cost $35.00 per month, how likely would you be to buy the pass? Would you...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass?
4 Probably not buy a pass? F75
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

R42. And if the pass cost $45.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F76
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

R43. And if the pass cost $50.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F77
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

R44. Now, if the CTA fare were to increase to $1.25 plus $.25 for a transfer and the pass were to cost $50.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass?
4 Probably not buy a pass? F78
5 Definitely not buy a pass?
6 Don't know [Do not read]

R45. Now, please tell me; if you were to buy a pass, how would you prefer to buy it? Would you prefer to buy it ...
[Accept up to three responses]

1 By mail?
2 At your place of employment? F79
3 At a local store? F80
4 At a bank? F81
5 At a currency exchange?
6 Other

R46 Now we would like to know whether you would prefer to use the "Weekday Only" monthly pass oR tokens to pay your CTA fares. If the "Weekday Only" pass cost $45 and each token cost $.85, how likely would you be to buy the "Weekday Only" pass? Would you ...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass?
4 Probably not buy a pass? F82
5 Definitely not buy a pass?
6 Don't know [Do not read]

[Go to D1]

PASS USAGE QUESTIONS FOR FULL FARE RIDER: "PEAK ONLY" PASS

Now, we would like you to tell us whether you would use a "Peak Only" monthly pass or cash to pay for your CTA trips under different conditions. Remember, the "Peak Only" pass will allow you unlimited travel during the rush hours from 6 a.m. to 10 a.m. and from 3 p.m. to 7 p.m. weekdays. The pass will be easy to buy at a local bank, currency exchange or grocery store.

Y41. If the cash fare were to stay at $1.00 plus $.25 for a transfer and the pass cost $30.00 per month, how likely would you be to buy the pass? Would you...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F75
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

Y42. And if the pass cost $35.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F76
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

Y43. And if the pass cost $40.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F77
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

Y44. Now, if the CTA fare were to increase to $1.25 plus $.25 for a transfer and the pass were to cost $40.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F78
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

Y45. Now, please tell me; if you were to buy a pass, how would you prefer to buy it? Would you prefer to buy it ... [Accept up to three responses]

1 By mail?
2 At your place of employment? F79
3 At a local store? F80
4 At a bank? F81
5 At a currency exchange?
6 Other

Y46. Now we would like to know whether you would prefer to use the "Peak Only" monthly pass or tokens to pay your CTA fares. If the "Peak Only" pass cost $35 and each token cost $.85, how likely would you be to buy the "Peak Only" pass? Would you ...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass?
4 Probably not buy a pass? F82
5 Definitely not buy a pass?
6 Don't know [Do not read]

[Go to D1]

TOKEN QUESTIONS FOR REDUCED FARE RIDER

The CTA is thinking about reducing the price of tokens. We would like you to tell us whether you would use tokens in place of cash under different conditions. First, think about buying single trip tokens in packs of twenty available at local banks, currency exchanges and grocery stores.

P33. If the reduced cash fare were to stay at $.50 plus $.15 for a transfer and the tokens cost $8.00 for twenty rides plus $.15 for a transfer, how likely would you be to buy the tokens? Would you ...

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F69
4 Probably not buy tokens?
5 Definitely not buy tokens? [Go to P37 on next page]
6 Don't know [Do not read]

P34. And if the tokens cost $9.00 for twenty, how likely would you be to buy the tokens? Would you ...

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F70
4 Probably not buy tokens?
5 Definitely not buy tokens? [Go to P37 on next page]
6 Don't know [Do not read]

P35. And if the tokens cost $10.00 for twenty, how likely would you be to buy the tokens?

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F71
4 Probably not buy tokens?
5 Definitely not buy tokens?
6 Don't know [Do not read]

P36. Now, if the reduced cash fare were increased to $.75 plus $.15 for a transfer and the tokens cost $10.00 for twenty, how likely would you be to buy the tokens?

1 Definitely buy tokens?
2 Probably buy tokens?
3 Maybe buy tokens? F72
4 Probably not buy tokens?
5 Definitely not buy tokens?
6 Don't know [Do not read]

ROUTING INSTRUCTIONS FOR PASS TYPE FOR REDUCED FARE RIDERS

P37. The CTA is thinking about expanding its pass program by adopting two different types of monthly reduced fare passes for people with different travel needs.

* The "Every Day" monthly pass will allow unlimited travel any time of the day or week at a substantial discount.

* The "Weekday" pass will allow unlimited travel on weekdays only and will have a lower price than the "Every Day" pass.

We would like to know which of these passes you might consider buying. Would you consider buying ...

1 The "Every Day" pass or	[Go to Brown 41]	
2 The "Weekday" pass.	[Go to Green 41]	
		F73

[If multiple responses, use first response given]
[If no selection say:

We would still like to ask you some questions about passes. Which pass would you be willing to answer questions about?

1 The "Every Day" pass or	[Go to Brown 41]	
2 The "Weekday" pass.	[Go to Green 41]	
9 None	[Go to D1]	
Wouldn't buy any pass		F74

PASS USAGE QUESTIONS FOR REDUCED FARE RIDER: "EVERY DAY" PASS

Now, we would like you to tell us whether you would use an "Every Day" monthly pass or cash to pay for your CTA trips under different conditions. Remember, the "Every Day" monthly pass will allow you to travel as much as you wish any day and at any time of day. The pass will be easy to buy at a local bank, currency exchange or grocery store.

BR41. If the cash fare were to stay at $.50 plus $.15 for a transfer and the pass cost $20.00 per month, how likely would you be to buy the pass? Would you...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F75
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

BR42. And if the pass cost $25.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F76
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

BR43. And if the pass cost $30.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F77
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

B44. Now, if the CTA fare were to increase to $.75 plus $.15 for a transfer and the pass were to cost $30.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F78
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

BR45. Now, please tell me; if you were to buy a pass, how would you prefer to buy it? Would you prefer to buy it ...
[Accept up to three responses]

1 By mail?
2 At your place of employment? F79
3 At a local store? F80
4 At a bank? F81
5 At a currency exchange?
6 Other

BR46. Now we would like to know whether you would prefer to use the "Every Day" monthly pass or tokens to pay your CTA fares. If the "Every Day" reduced fare pass cost $25 and each token cost $.50, how likely would you be to buy the "Every Day" pass? Would you ...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F82
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

[Go to D1]

PASS USAGE QUESTIONS FOR REDUCED FARE RIDER: "WEEKDAY" PASS

Now, we would like you to tell us whether you would use a "Weekday Only" monthly pass or cash to pay for your CTA trips under different conditions. Remember, the "Weekday Only" pass will allow you unlimited travel on weekdays only. The pass will be easy to buy at a local bank, currency exchange or grocery store.

GR41. If the cash fare were to stay at $.50 plus $.15 for a transfer and the pass to cost $15.00 per month, how likely would you be to buy the pass? Would you...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F75
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

GR42. And if the pass to cost $20.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F76
4 Probably not buy a pass?
5 Definitely not buy a pass? [Go to D1 on White Page]
6 Don't know [Do not read]

GR43. And if the pass cost $25.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F77
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

GR44. Now, if the CTA fare were to increase to $.75 plus $.15 for a transfer and the pass were to cost $25.00 per month, how likely would you be to buy the pass?

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F78
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

GR45. Now, please tell me; if you were to buy a pass, how would you prefer to buy it? Would you prefer to buy it ...
[Accept up to three responses]

1 By mail?
2 At your place of employment? F79
3 At a local store? F80
4 At a bank? F81
5 At a currency exchange?
6 Other

GR46. Now we would like to know whether you would prefer to use the "Weekday Only" monthly pass or tokens to pay your CTA fares. If the "Weekday Only" pass cost $20 and each token cost $.50, how likely would you be to buy the "Weekday Only" pass? Would you ...

1 Definitely buy a pass?
2 Probably buy a pass?
3 Maybe buy a pass? F82
4 Probably not buy a pass?
5 Definitely not buy a pass?
6 Don't know [Do not read]

[Go to D1]

DEMOGRAPHICS

To complete this survey, we would like to ask a few questions for statistical purposes.

D1. Do you have a driver's license?

1 Yes
2 No

9 Refused F83

D2. How many of the people living in your household, including yourself, have driver's licenses?

Record number ________ [Should be less than or equal response to Quest 1]

99 Refused F84-85

D3. How many vehicles (car, van or other) are generally available to members of your household?

Record number ________ F86

9 Refused

D4. Which of the following groups includes your age:

1 12-17
2 18-24
3 25-34 F87
4 35-44
5 45-64
6 65 or over
9 Refused

D5. What is the Zip code where you live?

Record number 60 __ __ __ F88-90

999 Refused/DK

D6. What is your racial or ethnic heritage? White, Black/Afro-American, Hispanic, or what?
[Do not read]
1 White
2. Black/Afro-American
3. Hispanic/Spanish American/Chicano F91
4. Asian/Oriental
5. Other
6. Refused

D7. Are you employed?

1 Yes
2 No F92
9 Refused/DK

D8. Lastly, what was your approximate TOTAL FAMILY INCOME in 1988 before taxes? (Just stop me when I read the correct category).

1 Under $10,000
2. $10,000 - $20,000
3. $20,000 - $30,000
4. $30,000 - $40,000
5. $40,000 - $50.000 F93
6. More than $50,000
9. Refused/Don't know

D9. Sex (By observation)

1. Male
2. Female F94

[Terminate session]

APPENDIX 2

DISTRIBUTION OF SOCIO-DEMOGRAPHIC CHARACTERISTICS

```
    Household Size: Number of Persons Age 12 and Up

                                                  Valid     Cum
  Value Label            Value  Frequency  Percent  Percent  Percent

                             1       200     25.0     25.0     25.0
                             2       246     30.8     30.8     55.8
                             3       166     20.8     20.8     76.6
                             4        91     11.4     11.4     88.0
                             5        53      6.6      6.6     94.6
                             6        22      2.8      2.8     97.4
                             7         7       .9       .9     98.2
                             8         5       .6       .6     98.9
                             9         2       .3       .3     99.1
                            10         5       .6       .6     99.7
                            12         2       .3       .3    100.0
                                 -------  -------  -------
                         TOTAL       799    100.0    100.0

Mean           2.668
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of CTA Users (rode CTA in past week) in Household

                                                  Valid     Cum
  Value Label            Value  Frequency  Percent  Percent  Percent

                             1       402     50.3     50.3     50.3
                             2       246     30.8     30.8     81.1
                             3        81     10.1     10.1     91.2
                             4        39      4.9      4.9     96.1
                             5        14      1.8      1.8     97.9
                             6         9      1.1      1.1     99.0
                             7         3       .4       .4     99.4
                             8         4       .5       .5     99.9
                            10         1       .1       .1    100.0
                                 -------  -------  -------
                         TOTAL       799    100.0    100.0

Mean           1.852
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
     Respondent Has Driver's License

                                                  Valid     Cum
  Value Label            Value  Frequency  Percent  Percent  Percent

Yes                          1       472     59.1     59.1     59.1
No                           2       327     40.9     40.9    100.0
                                 -------  -------  -------
                         TOTAL       799    100.0    100.0
```

```
Number of Licensed Drivers in Household

                                                       Valid     Cum
  Value Label             Value  Frequency  Percent  Percent  Percent

                              0        124     15.5     15.6     15.6
                              1        283     35.4     35.7     51.3
                              2        243     30.4     30.6     82.0
                              3         92     11.5     11.6     93.6
                              4         38      4.8      4.8     98.4
                              5          8      1.0      1.0     99.4
                              6          3       .4       .4     99.7
                              7          2       .3       .3    100.0
                              .          6       .8  MISSING
                                   -------  -------  -------
                          TOTAL        799    100.0    100.0

Mean          1.600
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of Cars in Household

                                                       Valid     Cum
  Value Label             Value  Frequency  Percent  Percent  Percent

                              0        202     25.3     25.8     25.8
                              1        335     41.9     42.7     68.5
                              2        180     22.5     23.0     91.5
                              3         48      6.0      6.1     97.6
                              4         14      1.8      1.8     99.4
                              5          1       .1       .1     99.5
                              6          3       .4       .4     99.9
                              7          1       .1       .1    100.0
                              .         10      1.3  MISSING
Refused                       9          5       .6  MISSING
                                   -------  -------  -------
                          TOTAL        799    100.0    100.0

Mean          1.180
```

```
     Age Group

                                                             Valid     Cum
  Value Label                   Value  Frequency  Percent  Percent  Percent

12-17                              1        55      6.9      6.9      6.9
18-24                              2       127     15.9     16.0     23.0
25-34                              3       181     22.7     22.9     45.8
35-44                              4       145     18.1     18.3     64.1
45-64                              5       173     21.7     21.8     86.0
65+                                6       111     13.9     14.0    100.0
                                   .         1       .1  MISSING
Refused                            9         6       .8  MISSING
                                       -------  -------  -------
                               TOTAL       799    100.0    100.0
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Race

                                                             Valid     Cum
  Value Label                   Value  Frequency  Percent  Percent  Percent

White                              1       333     41.7     42.2     42.2
Black                              2       352     44.1     44.6     86.8
Hispanic                           3        60      7.5      7.6     94.4
Asian/Oriental                     4        20      2.5      2.5     97.0
Other                              5        24      3.0      3.0    100.0
                                   .         2       .3  MISSING
Refused                            6         8      1.0  MISSING
                                       -------  -------  -------
                               TOTAL       799    100.0    100.0
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Employed

                                                             Valid     Cum
  Value Label                   Value  Frequency  Percent  Percent  Percent

Yes                                1       542     67.8     68.5     68.5
No                                 2       249     31.2     31.5    100.0
                                   .         1       .1  MISSING
Refused/Don't know                 9         7       .9  MISSING
                                       -------  -------  -------
                               TOTAL       799    100.0    100.0
     Income Group (Based on Total Family Income Before Taxes)

                                                         Valid     Cum
  Value Label                Value  Frequency  Percent  Percent  Percent

$ 0 - 10K                        1         81     10.1     13.6     13.6
$10 - 20K                        2        150     18.8     25.2     38.8
$20 - 30K                        3        155     19.4     26.1     64.9
$30 - 40K                        4         82     10.3     13.8     78.7
$40 - 50K                        5         50      6.3      8.4     87.1
$50+K                            6         77      9.6     12.9    100.0
                                 .          2       .3  MISSING
Refused/Don't know               9        202     25.3  MISSING
                                      -------  -------  -------
                             TOTAL        799    100.0    100.0
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Sex

                                                         Valid     Cum
  Value Label                Value  Frequency  Percent  Percent  Percent

Male                             1        267     33.4     33.5     33.5
Female                           2        531     66.5     66.5    100.0
                                 .          1       .1  MISSING
                                      -------  -------  -------
                             TOTAL        799    100.0    100.0
```

APPENDIX 3

RIDERSHIP AND METHOD OF PAYMENT CHARACTERISTICS

```
     Number of days CTA used in past week

                                                          Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                                  1         79      9.9      9.9      9.9
                                  2        100     12.5     12.5     22.4
                                  3         78      9.8      9.8     32.2
                                  4         71      8.9      8.9     41.1
                                  5        265     33.2     33.2     74.2
                                  6         92     11.5     11.5     85.7
                                  7        114     14.3     14.3    100.0
                                       -------  -------  -------
                              TOTAL        799    100.0    100.0

Mean          4.345
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of weekdays CTA used in past week

                                                          Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                                  0          5       .6       .6       .6
                                  1        111     13.9     13.9     14.5
                                  2         94     11.8     11.8     26.3
                                  3         84     10.5     10.5     36.8
                                  4         67      8.4      8.4     45.2
                                  5        438     54.8     54.8    100.0
                                       -------  -------  -------
                              TOTAL        799    100.0    100.0

Mean          3.766
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of weekend days CTA used in last week

                                                          Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                                0.0        469     58.7     58.7     58.7
                               1.00        197     24.7     24.7     83.4
                               2.00        133     16.6     16.6    100.0
                                       -------  -------  -------
                              TOTAL        799    100.0    100.0

Mean           .579
```

```
     CTA trips on last weekday CTA used

                                                        Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                                  1         83     10.4     10.5     10.5
                                  2        525     65.7     66.1     76.6
                                  3         56      7.0      7.1     83.6
                                  4         80     10.0     10.1     93.7
                                  5         19      2.4      2.4     96.1
                                  6         22      2.8      2.8     98.9
                                  7          2       .3       .3     99.1
                                  8          4       .5       .5     99.6
                                 10          3       .4       .4    100.0
Branching bypassed               98          5       .6  MISSING
                                     -------  -------  -------
                              TOTAL        799    100.0    100.0

Mean           2.423
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of single-bus CTA trips last CTA weekday

                                                        Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                                  0        509     63.7     64.1     64.1
                                  1         90     11.3     11.3     75.4
                                  2        163     20.4     20.5     96.0
                                  3         13      1.6      1.6     97.6
                                  4         11      1.4      1.4     99.0
                                  5          3       .4       .4     99.4
                                  6          3       .4       .4     99.7
                                  8          2       .3       .3    100.0
Branching bypassed               98          5       .6  MISSING
                                     -------  -------  -------
                              TOTAL        799    100.0    100.0

Mean            .690
```

```
     Number of Multiple bus trips last CTA weekday

                                                        Valid     Cum
  Value Label               Value  Frequency  Percent  Percent  Percent

                                0        453     56.7     57.1     57.1
                                1         85     10.6     10.7     67.8
                                2        190     23.8     23.9     91.7
                                3         24      3.0      3.0     94.7
                                4         28      3.5      3.5     98.2
                                5          7       .9       .9     99.1
                                6          7       .9       .9    100.0
Branching bypassed             98          5       .6  MISSING
                                     -------  -------  -------
                            TOTAL        799    100.0    100.0

Mean           .914
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
     Number of bus-rail trips last CTA weekday

                                                        Valid     Cum
  Value Label               Value  Frequency  Percent  Percent  Percent

                                0        576     72.1     72.5     72.5
                                1         56      7.0      7.1     79.6
                                2        126     15.8     15.9     95.5
                                3         14      1.8      1.8     97.2
                                4         16      2.0      2.0     99.2
                                5          2       .3       .3     99.5
                                6          3       .4       .4     99.9
                                8          1       .1       .1    100.0
Branching bypassed             98          5       .6  MISSING
                                     -------  -------  -------
                            TOTAL        799    100.0    100.0

Mean           .567
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
     Number of rail-only trips last CTA weekday

                                                        Valid     Cum
  Value Label               Value  Frequency  Percent  Percent  Percent

                                0        687     86.0     86.5     86.5
                                1         27      3.4      3.4     89.9
                                2         74      9.3      9.3     99.2
                                3          1       .1       .1     99.4
                                4          3       .4       .4     99.7
                                5          2       .3       .3    100.0
Branching bypassed             98          5       .6  MISSING
                                     -------  -------  -------
                            TOTAL        799    100.0    100.0

Mean           .252
```

```
     Number of peak-hr CTA trips last CTA weekday

                                                         Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                                  0        104     13.0     13.1     13.1
                                  1        174     21.8     21.9     35.0
                                  2        419     52.4     52.8     87.8
                                  3         35      4.4      4.4     92.2
                                  4         41      5.1      5.2     97.4
                                  5         14      1.8      1.8     99.1
                                  6          5       .6       .6     99.7
                                  7          1       .1       .1     99.9
                                 10          1       .1       .1    100.0
Branching bypassed               98          5       .6  MISSING
                                       -------  -------  -------
                              TOTAL        799    100.0    100.0

Mean           1.761
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Change in CTA usage over last year

                                                         Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

Increased                         1        171     21.4     21.5     21.5
Decreased                         2        163     20.4     20.5     42.0
Same                              3        448     56.1     56.4     98.4
New rider                         4         11      1.4      1.4     99.7
Don't know                        8          2       .3       .3    100.0
                                  .          4       .5  MISSING
                                       -------  -------  -------
                              TOTAL        799    100.0    100.0

Mean           2.391
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Reduced fare eligibility

                                                         Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

No                                0        600     75.1     75.1     75.1
Student                           1         66      8.3      8.3     83.4
Elderly                           2        116     14.5     14.5     97.9
Disabled                          3         17      2.1      2.1    100.0
                                       -------  -------  -------
                              TOTAL        799    100.0    100.0
     Pass usage, last 3 months

                                                   Valid     Cum
  Value Label           Value  Frequency  Percent  Percent  Percent

No                          0        587     73.5     73.5     73.5
Yes - monthly               1        158     19.8     19.8     93.2
Yes - 14-day                2         44      5.5      5.5     98.7
Yes - both                  3         10      1.3      1.3    100.0
                                 -------  -------  -------
                            TOTAL    799    100.0    100.0
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of Monthly passes purchased last three months

                                                   Valid     Cum
  Value Label           Value  Frequency  Percent  Percent  Percent

                            1         25      3.1     14.9     14.9
                            2         25      3.1     14.9     29.8
                            3        118     14.8     70.2    100.0
Branching bypassed         98        631     79.0  MISSING
                                 -------  -------  -------
                            TOTAL    799    100.0    100.0

Mean          2.554
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of 14-day passes purchased last three months

                                                   Valid     Cum
  Value Label           Value  Frequency  Percent  Percent  Percent

                            1          8      1.0     14.8     14.8
                            2         14      1.8     25.9     40.7
                            3          7       .9     13.0     53.7
                            4          3       .4      5.6     59.3
                            5          1       .1      1.9     61.1
                            6         20      2.5     37.0     98.1
                            7          1       .1      1.9    100.0
Branching bypassed         98        745     93.2  MISSING
                                 -------  -------  -------
                            TOTAL    799    100.0    100.0

Mean          3.722
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Token usage during last 3 months
                                                   Valid     Cum
  Value Label           Value  Frequency  Percent  Percent  Percent

No                          1        659     82.5     82.5     82.5
Yes                         2        140     17.5     17.5    100.0
                                 -------  -------  -------
                            TOTAL    799    100.0    100.0
     Number of times tokens purchased during last three months

                                                          Valid     Cum
  Value Label                  Value  Frequency  Percent  Percent  Percent

                                   1        18      2.3     12.9     12.9
                                   2        32      4.0     22.9     35.7
                                   3        19      2.4     13.6     49.3
                                   4        11      1.4      7.9     57.1
                                   5         5       .6      3.6     60.7
                                   6        16      2.0     11.4     72.1
                                   7         1       .1       .7     72.9
                                   8         2       .3      1.4     74.3
                                   9         2       .3      1.4     75.7
                                  10         4       .5      2.9     78.6
                        More than 10        30      3.7     21.4    100.0
Branching bypassed                98       659     82.5  MISSING
                                       -------  -------  -------
                               TOTAL       799    100.0    100.0

Mean            5.643
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Number of tokens bought on last purchase

                                                          Valid     Cum
  Value Label                  Value  Frequency  Percent  Percent  Percent

                                   1        20      2.5     14.3     14.3
                                   2        15      1.9     10.7     25.0
                                   3         2       .3      1.4     26.4
                                   4         5       .6      3.6     30.0
                                   5         1       .1       .7     30.7
                                   6         1       .1       .7     31.4
                                  10        46      5.8     32.9     64.3
                                  20        33      4.1     23.6     87.9
                        More than 20        17      2.1     12.1    100.0
Branching bypassed                98       659     82.5  MISSING
                                       -------  -------  -------
                               TOTAL       799    100.0    100.0

Mean           13.714
```

```
     How often buy transfer to use with token

                                                        Valid     Cum
  Value Label               Value  Frequency  Percent  Percent  Percent

Never                           1        21      2.6     15.0     15.0
Some of the time                2        49      6.1     35.0     50.0
Half of the time                3        12      1.5      8.6     58.6
Most of the time                4        18      2.3     12.9     71.4
All of the time                 5        39      4.9     27.9     99.3
Refused/Don't know              9         1       .1       .7    100.0
Branching bypassed             98       659     82.5  MISSING
                                     -------  -------  -------
                            TOTAL       799    100.0    100.0

Mean          3.079
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     How often pay cash to use CTA

                                                        Valid     Cum
  Value Label               Value  Frequency  Percent  Percent  Percent

Never                           1       160     20.0     20.0     20.0
Some of the time                2       147     18.4     18.4     38.4
Half of the time                3        21      2.6      2.6     41.1
Most of the time                4        51      6.4      6.4     47.4
All of the time                 5       420     52.6     52.6    100.0
                                     -------  -------  -------
                            TOTAL       799    100.0    100.0
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Estimated total CTA trips per week

                                                        Valid     Cum
  Value Label               Value  Frequency  Percent  Percent  Percent

                              1-5       206     25.8     25.8     25.8
                             6-10       305     38.2     38.2     64.0
                            11-15       151     18.9     18.9     82.9
                            16-20        71      8.8      8.8     91.7
                            21-30        51      6.4      6.4     96.5
                     More than 30        15      1.9      1.9    100.0
                                     -------  -------  -------
                            TOTAL       799    100.0    100.0

Mean         10.538
```

```
     Method of payment share for pass

                                                          Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                               0.0        587     73.5     73.5     73.5
                            .01-.25         7      0.8      0.8     74.3
                            .26-.50        15      1.9      1.9     76.2
                            .51-.75        39      4.9      4.9     81.1
                            .76-.99        34      4.3      4.3     85.4
                              1.00        117     14.6     14.6    100.0
                                      -------  -------  -------
                              TOTAL       799    100.0    100.0

Mean             .221
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Method of payment share for tokens

                                                          Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                               0.0        659     82.5     82.5     82.5
                            .01-.25        45      5.6      5.6     88.1
                            .26-.50        16      2.0      2.0     90.1
                            .51-.75        22      2.8      2.8     92.9
                            .76-.99        23      2.8      2.8     95.7
                              1.00         34      4.3      4.3    100.0
                                      -------  -------  -------
                              TOTAL       799    100.0    100.0

Mean             .097
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     Method of payment share for cash

                                                          Valid     Cum
  Value Label                 Value  Frequency  Percent  Percent  Percent

                               0.0        160     20.0     20.0     20.0
                            .01-.25        66      8.3      8.3     28.3
                            .26-.50        46      5.7      5.7     34.0
                            .51-.75        24      3.0      3.0     37.0
                            .76-.99        32      4.1      4.1     41.1
                              1.00        471     58.9     58.9    100.0
                                      -------  -------  -------
                              TOTAL       799    100.0    100.0

Mean             .682
```

8/4/2008
WT 140786 1 64 00
HF GROUP – IN